ARCHIVES OF OTOLOGY.

CASE OF CHRONIC PURULENT INFLAMMATION OF THE MIDDLE EAR ON BOTH SIDES,

PROVING FATAL, AFTER SEVEN YEARS, BY EXTENSION, ON THE LEFT SIDE, THROUGH THE LABYRINTHINE CAVITIES AND THE AUDITORY AND FACIAL NERVES TO THE INTERIOR OF THE CRANIUM—OPENING OF THE CAVITIES OF THE MIDDLE EAR—EXPOSURE BY OPERATION OF THE SIGMOID SINUS AND OF THE DURA MATER AT THE FLOOR OF THE MIDDLE CRANIAL FOSSA—DEATH BY CEREBELLAR SUPPURATION AND GENERAL LEPTO-MENINGITIS.[1]

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DR. BARR showed on the 8th February, 1897, two temporal bones, from different cases, illustrating how septic infection may pass from the tympanic cavity and mastoid antrum through the labyrinthine spaces and auditory and facial nerves to the cerebellar cavity. His remarks chiefly referred to one of these, namely: the left temporal bone of a lad, seventeen years of age, who had suffered from purulent disease of both middle ears for seven years, and who had died from cerebellar disease and lepto-meningitis. This bone presented three large operation cavities on its outer aspect; one of them, an inch long by half an inch broad, exposed the sigmoid sinus and neighboring part of the dura mater; a second opening exposed the dura mater over the floor and outer wall of the middle fossa; and a third exposed the cavity of the antrum. The greater part

[1] Brought before Glasgow Pathological and Clinical Society on the 8th February, 1897.

of the posterior wall of the external canal had also been removed by operation, while part of the tympanic wall of the labyrinth was found to be destroyed by caries. In the upper part of the tympanic membrane there was a large perforation, and of the ossicula only the malleus remained.

Pathologically, the most remarkable feature was the existence of a large cavity, lined by a soft membrane, occupying the petrous part and continuous with the antrum,—this was the result of necrotic destruction of the whole of the labyrinth. The only trace of the labyrinth found in this cavity was a small loose sequestrum, consisting of a portion of the cochlea. In the roof of this cavity, corresponding with the position of the cochlea, there was a carious opening, penetrating the bony floor of the middle cranial fossa, but covered by healthy dura mater. The cribriform lamina had been eroded away, the auditory nerve presenting here an abrupt and ragged ending. The stem of the nerve was much thickened, especially just where it had been cut through at the entrance to the internal auditory meatus.

The condition of the facial nerve was also of much interest. In the internal auditory meatus, it was inextricably united with the auditory nerve, evidently sharing in the swelling and the thickening of the latter. At its knee-shaped bend —the geniculate ganglion—where it is joined by the large and small superficial petrosal nerves and the external superficial petrosal nerve, it was denuded of its bony covering by the caries already referred to in the floor of the middle fossa, and it was there directly under the dura mater, while at the posterior part of the inner wall of the tympanum the nerve was destroyed.

The cerebellum at the anterior part of the lateral lobe, in the neighborhood of the internal auditory meatus, was found to be superficially ulcerated, and pus, having a fœtid odor, though not in large quantity, was seen to extend mesially and deeply into the cerebellar tissue. In the meshes of the pia-arachnoid, both on the convexity and at the base of the brain, there was extensive fibrinous exudation, specially marked at the left side of the medulla and pons, where the sixth nerve, the facial and auditory branches of the seventh,

the glosso-pharyngeal, and the pneumogastric were entangled in the exudation.

In regard to the history and clinical features of this case, the chief points were: 1st. The existence of a purulent disease in both middle ears for seven years with perforation of Shrapnell's membrane for which all ordinary remedies had been ineffectually employed. Three months before death symptoms of intracranial mischief showed themselves. A large polypus which at that time obstructed the left external meatus was removed and the cavities of the middle ear, including the antrum, were then also freely opened and cleared out. Temporary improvement followed, but on the occurrence of still more marked symptoms of intracranial mischief Dr. J. H. Nicoll freely exposed the sigmoid sinus and also the dura mater lining the outer part of the floor of the middle fossa, but in neither situation was there found any purulent collection or any other sign of disease. The patient died a week afterwards with symptoms of lepto-meningitis. Dr. Barr observed that this is probably a much more common pathway of infection than is usually considered, and in a practical point of view it is very important to determine, in a given case, if this is really the pathway of infection, because such knowledge would throw light upon the nature and situation of the brain lesion. In order to determine this we must not omit the careful examination of the tympanic wall of the labyrinth with the eye assisted by the probe, so as to discover if possible whether the bone here is broken down with caries. We should also, when operating on the antrum, examine closely the state of the posterior part of the labyrinth. If in either or both of these ways the labyrinth is found to be involved in the disease, the probability is that the intracranial lesion is under the tentorium in connection with the anterior part of the cerebellum, in the neighborhood of the internal auditory meatus.

There was no sign of disease in the bone forming the favorite pathway of infection, namely, the groove for the sigmoid sinus, nor in the roof of the middle ear. Evading these the disease penetrated, probably from both the antrum and tympanum, into the labyrinth, destroying the structure

contained therein, leaving nothing but the capsule. Afterwards, breaking down the perforated plate of bone through which the nerve enters the labyrinth, the pathogenic organisms travelled along the auditory and facial nerves, infecting first the cerebellum and then the soft membranes of the brain.

While in this case, the situation and character of the suppuration in the cerebellum were such as to preclude operative treatment, it is to be hoped that surgery may yet find a way of reaching and dealing with brain suppuration in the neighborhood of the internal auditory meatus. So far cerebellar suppuration in that situation, if limited in extent, is comparatively inaccessible, contrasting unfavorably with the more common situation for cerebellar abscess, namely, near to and in connection with the sigmoid sinus.

CASE OF CEREBELLAR SUPPURATION CAUSED BY MIDDLE-EAR INFECTION THROUGH THE INTERNAL AUDITORY MEATUS, WITH THROMBOSIS OF THE CAVERNOUS SINUSES, AND BASIC LEPTO-MENINGITIS.[1]

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THIS brain and right temporal bone belonged to a man, forty-five years of age, who died on Wednesday last. They illustrate the effects of purulent middle-ear disease in producing cerebellar abscess, lepto-meningitis of the base, and thrombosis of the *cavernous sinuses.*

Brain.—In the base of the brain an aperture is seen at the front of the right *cerebellar hemisphere*, just where the latter lies in contact with the internal auditory meatus. This aperture leads into an abscess cavity, occupying the greater part of the right hemisphere; this contained pus, which had a most offensive odor. Fibrinous exudation on the pia-arachnoid is seen in considerable quantity over the base of the brain, especially along the vessels in the fissure of

[1] These remarks were made before the Glasgow Medico-Chirurgical Society in connection with a brain and temporal bone shown to the Society in May last. The case referred to came under my observation after the despatch of the manuscript describing the case preceding this one. It shows a similar mode of intra-cranial infection, namely, by the internal auditory meatus; a mode of infection which my experience shows to be more common than is usually supposed. These cases likewise prove that cerebellar suppuration, or abscess, is not always the result of thrombosis with purulent formation round the sigmoid sinus, and we are, therefore, not justified in concluding that there is no cerebellar abscess, when we find on exposing the sigmoid sinus that this venous channel is intact. This is not quite in accordance with the opinion expressed in the quotation from the lectures of Prof. Macewen, which appeared in these ARCHIVES, in the April number of this year, at page 210.

Sylvius. There is no purulent formation in the temporal-sphenoidal lobe or other part of the brain.

Temporal Bone.—The condition of the temporal bone shows that the septic invasion from the middle ear took place through the labyrinth and internal auditory canal. The auditory and facial nerves in the internal auditory meatus are reddened, swollen, and matted together. The inner wall of the tympanum is eroded by caries, especially in the neighborhood of the fenestra ovalis, which is enlarged by the carious destruction. Behind this the Fallopian canal is seen to be opened by the disease and the nerve exposed. In these ways the purulent disease, which had for years existed in the middle ear, involved the structures in the labyrinth. Another carious aperture is seen in the posterior surface of the petrous bone, just behind the internal auditory meatus; this communicates with the vestibule, and seems to be in the situation of the aqueductus vestibuli. The bony roof of the middle ear and its superimposed dura-mater are free from disease. A large opening is seen in the mastoid, made, two weeks before death, by operation through intensely sclerosed bone; in this way the antrum was reached and thoroughly cleared out.

Condition of the Sinuses.—There is neither thrombosis of, nor purulent formation around, the sigmoid sinus, indeed *there is no sign of disease in the sinus or its bony groove.* A very important feature, however, is the existence of distinct thrombosis of the cavernous sinuses on both sides in which a firm ante-mortem clot was found. In connection with this the following report by Dr. Leslie Buchanan of the examination of the optic nerve, its sheath, and the posterior segment of the eyeball, is instructive.

"There are rather more than usual round cells following the connective tissue of the optic nerve, indicating an early stage of inflammatory action. The most noteworthy change is in the optic nerve, where patches of fibrino-cellular material are found fixing the sheath to the nerve itself. From its shape otherwise it is judged that the sheath of the nerve contained more fluid than usual. The intra-ocular extremity of the optic nerve shows evidence of œdema by separation

of the fibre, but there is no evidence of other inflammatory change, such as a cellular infiltration, of either the optic-nerve entrance or of the retina. The choroid shows some slight overfilling of the vessels, but no other change. There is no appearance of any inflammatory change round the sheaths of the ciliary nerves. The changes in the optic-nerve sheath are evidently in an early stage, and there can be no doubt but that a few hours later the signs would have been much more manifest."

Synopsis of Symptoms.—The patient had a purulent disease of the right middle ear for five years before death, with the hearing practically gone in that ear. Polypoid growths had sprouted out from time to time for months before death. They were cauterized by his family doctor, and snared at the Ear Hospital. The external meatus was also considerably stenosed. The symptoms connected with his last illness began five weeks before death. These symptoms were: giddiness so severe that he had to be helped in walking; intense pain, first in the ear and then in the head, affecting both the frontal and occipital regions, and persisting so long as consciousness lasted; one rigor, not severe in character, occurring at an early stage. Temperature ranging from the normal to a hundred degrees Fahrenheit, till a few hours before death, when it mounted very high. Pulse tended to be subnormal, ranging from 50 to 76 in the minute. Delirious excitement latterly supervened, terminating in complete coma twelve hours before death. *There was neither sickness nor vomiting.* The eyes were examined several times, the last examination being made thirty-six hours before death. Neither optic neuritis, disturbance of the pupils, nor paralysis of the ocular muscles was found at any of these examinations. Soon after the last examination, however, distinct protrusion of the eyeballs began to be noticed. Unfortunately, the fundus of the eye was not examined after this phenomenon appeared. From the condition after death already referred to, changes in the fundus would no doubt have been observed had an ophthalmoscopic examination been made later on. The thrombosis of the cavernous sinuses was probably a later phenomenon, otherwise we might have expected thrombic changes in the sigmoid sinus.

POPULAR MEDICAL SUPERSTITIONS CONCERNING THE DISEASES OF THE EAR, NOSE, AND THROAT.

By Dr. KARUTZ, of Luebeck.

Translated by Dr. J. A. Spalding, Portland, Me.

VARIOUS ethnological investigations made for other purposes have accidentally furnished me with considerable material regarding popular medicine, and especially regarding otology and its allied diseases. All of us know from daily experience something of the common popular remedies, but a few may be interested to hear a little more of the curiosities of country practice, or to study a little deeper the mass of superstition which still exists so abundantly in the backwoods and uncultivated portions of the earth, and which so obstinately resist suppression by the medical or public press.

Before studying the actual *treatment* of diseases of the ear, nose, and throat as popularly carried out, and as based on a foundation of superstitious ideas, misunderstood occurrences, or half-correct observations, and which, thanks to blindly trusted tradition, have maintained their position for centuries, the popular *prophylaxis* of our specialty deserves a few words. This, of course, moves along parallel with the popular idea of the etiology of diseases, and reveals reflexes of the heathen creeds, despite the regeneration and leaven of later Christianity. Thus gold, silver, and lead ear-rings are still used all over Germany as protectives against diseases of the ear, and it is probably less the derivative action of the incision or its permanent irritation, than the remnant of

an ancient medical *treatment* which, to this day, prevents popular confidence in these rings from being shattered. Furthermore, in Bavaria we meet with the widespread myth regarding the *transmission* of ear disease, which insists that lead ear-rings shall only be worn a little while, and then, without a word, thrown over the head or left shoulder into running water.

Similarly, we find bracelets made of amber enjoying great renown amongst those suffering from diseases of the ears. The people of East Carinthia also take the greatest care not to cleanse the ears of their children after they reach the age of one year, lest they should begin to "run." In Bosnia, we hear that one must not step on a bit of bread, lest deafness ensue and remain for life.

Amongst affections of the nose we learn a great deal curious about epistaxis. Thus he who suffers in this way ought to offer as a sacrifice a ball of red silk. A dweller in the Canton of Berne, who finds his nose swollen on arising in the morning, refers it to the breath of a witch in the night. In Prussia a child remains forever protected from a bad neck, that is to say, a sore throat and nose trouble, if the mother, at her first communion after her delivery, breathes three times on the child's neck. In the Tyrol, popular belief insists that one should swallow three palm branches or pieces of the same (after being blessed by the priest) to ward off sore throat, and in Mecklenburg they bind a blue woollen thread about the child's throat.

When any one who has the influenza accidentally speaks of his affliction, then he should silently say to himself, "Complain to the Stone, And leave it alone." The catching of colds is often ascribed to having stepped over some spot dirty or befouled with dung. The actual word is unclean, which sounds sanitary, but probably means anything impure or heathenish, as opposed to Christianity. A popular idea forbids a pregnant woman from holding her nose at a bad odor, for if she should do so, the child will always smell out of his mouth instead of his nose.

A curious idea in Chemnitz is that a child which smells at anything before it is a year old will never smell again. And

whoever smells of flowers which have grown on a grave, or of orange flowers which have decorated the body of a child in its coffin, loses his sense of smell for life. In Mecklenburg you will get cancer of the nose if you smell on St. John's day of a flower on which a cricket has rested or over which he has been seen to fly. In Bohemia you can protect yourself from hoarseness if you cry loudly with the first croaking of the frogs that you hear in the spring. And, finally, in a prophylactic point of view, you must keep out of your ears the bloom of the buckwheat flower, or be deaf forever.

Suppose now that, despite all methods of prevention, or owing to neglect of the same, sore throat or pain in the neck and hoarseness appear, then gargling with sage and honey is valuable. Only, to do good, the gargle must be swallowed. In some regions a favorite gargle is a decoction in hot water of a handful of house leek with six living crabs. Children must not gargle but drink the remedy through an elder sprig from which the pith has been taken, elder being, from time immemorial, a sacred shrub.

Everywhere we hear of an old stocking for the throat, the idea probably arising from the constant and uniform warmth which it affords to the parts. Then, later, came the hocus pocus that the stocking, to be of any good, must have been worn and on the left foot only, and then turned inside out. In the same line of treatment, we mention a string stolen from the mouth of a meal-bag whilst still in the mill, a silk garter, unboiled flaxseed, the teeth from a pike, and the brains from a black cat, all of these being useful for children. The Wends believe in the use of a piece of meteoric stone, or a bit of a prehistoric stone axe, tied about the throat. In Halle they stroke the neck of a corpse of the opposite sex, and so cure a sore throat. Or, internally, they use the seeds of the thistle beaten up in brandy.

In case of mumps, a handful of silver- or hazel-thistle can be brewed in butter until it is soft, and then, wrapped in a soft linen cloth, it is placed on the swollen gland.

Canker of the mouth, in Schwabia, is cured by this exorcism:

> Oh! Holy Job went into the land,
> He held his cane straight in his hand.

Why, then, art thou sad?
Because my mouth feels bad.
Then take some water in thy mouth,
And let it run right down the spout.
And now, in the Name of the Holy Trinity, stop aching!

This has to be repeated several times daily for three days in succession, and at the mention of water into the mouth, you wash the mouth freely and then spit it out. If a child has the same disease, you must breathe forcibly into the mouth before you have had anything to eat in the morning, and then go and tie up in the chimney-place, till they rot, seven wood-bugs.

Diseases of the nose amongst the people are all "colds in the head" or "nose-bleed." In case of a baby with snuffles, rub goose-grease or suet over the region of the nose. In Bohemia, no one with a cold in his head dares to cross running-water, for, if he does, the cold will never leave him. A woman in Chemnitz, with a cold in her head, will smell of her husband's shoe when he lays it off at night, whilst in Mecklenburg she must do this three times in succession, and then, additionally, smell of the inside of the left stocking when that comes off. The good people of Pforzheim, with a cold, drink all liquids through a three-tined fork.

The idea of disease-transfer to another person is one that is widely spread. Thus, to transfer to another a bad cold in the head, all that is necessary, in Thuringia, is to blow the nose three times in succession through the ring on the door which they use as a handle or knocker. The person who next takes hold of the ring will catch the cold. Or the nose can be blown forcibly into a bit of paper, into which you next wrap an old copper coin, and then throw paper and all into the road behind you, and without looking to see where it falls. Whoever picks up the paper, and out of curiosity opens it, catches your cold. And again, blow the nose into another person's shoe, and when he puts it on, he gets the cold. Finally, Pliny proposes to get rid of the affliction by kissing the nose of a mare.

There are innumerable remedies against the nose-bleed. Harmless as this generally is, the occurrence is often ascribed

to demonic influence. In the Pfalzburg and other countries, some one in the family is sure to die soon if, from the nose of one of that family, three drops of blood, and three only, fall from the nose upon the hand. Whoever bleeds from the left nostril will have bad luck in all his affairs. In the Rhineland, if one of a pair of lovers happens to lose three drops of blood from the nose, the love between the couple is sure to be broken.

In the same way as great significance is laid on epistaxis occurring, so great influence is laid on charming it away, the number of exorcisms for which are countless. In Mecklenburg, for instance, they take a bit of stubble mown with a scythe, and write on the forehead of the person bleeding, the mysterious words "Uhi Upuli."

In the Aargau region they declaim:

> "Oh, let it rain long as it will,
> And let the brooklet run its fill;
> But when the rain has fallen enough,
> It soon will stop of its own free will."

In Westphalia they say:

In God's Garden there are three roses; one is God's Goodness, the second is God's Garland, and the third is God's Will. So, Blood, I command you to stop bleeding, and in the Name of the Holy Trinity stop!

Or here is another:

I once went into the street and found blood and water. The water I let flow, but the blood I ordered to cease, and now, in the Name of the Father, the Son, and the Holy Ghost, I say, Blood; stop!

In Schwabia they say:

On the grave of Christ grow three roses; the first is white, the second is red, and the third is God, who will stop this nose bleeding.

The Mecklenburger lays his right hand over his left, and then, with the hands so placed, he strokes the bleeder down the back, and says: "Blood stand still. For it is God's WILL."

In addition to these incantations many people resort to usages which are inclined to the mystic. Thus you draw a leg from a footstool, or a round from a ladder, moisten it with the blood trickling from the nose, and then drive it back into its former position. In Luebeck they pick up three stones from the road, let fall a drop of blood on each one, and then gravely and silently replace all three stones in their former dust. In Franconia a drop of blood is put on a stone taken from a grass-plot, or from under the house spout, then the Lord's Prayer is said, and the stone replaced.

In Holstein they take a wooden bolt from a carriage or chair or ladder, let a little blood from the nose fall on one end of the same, and then they return the object to its former position though in the opposite direction from that which it originally occupied. *Here we see the transfer to inanimate objects instead of to persons.*

A nose-bleed in Steiermark can be stopped by fastening around the little finger of the left hand a piece of red thread. But the Holsteiner asserts that this is useless, unless you wind the red thread on the little finger on the hand opposite the nostril affected with the bleeding. Or one can raise the arm opposite the nostril bleeding, and also hold upright the middle finger whilst the other hand is held limp with the middle finger outstretched. Some people throw cold water into the face, or down the neck, or camphorated brandy on the whole spine. Or they press violently a copper coin into the root of the nose, or a large door-key against the neck. Occasionally we hear of the nuts of cherry-stones and almonds being cracked, then mixed with bitter vinegar and rose water, and then all hanged in a bag behind the back of the neck. It is a good plan, too, to hold a blood-stone or the roots of a corn-flower which was lifted from the ground on Corpus Christi Day, in the hand until they are warm. In Silesia, the corn-flower is of no use unless gathered on St. John's Day, at midnight, and then kept on hand till needed. Burdock roots can be held in the hand, or put into the shoe and walked on for several hours, or blotting paper can be tried under the tongue, or a dried turtle placed in the axilla for so many hours.

In Bosnia they let a drop of the blood from the nose pass through a ring that has been taken from the right hand of a corpse, or the blood can be let fall on a cross made of straw or wooden matches. In Holstein, they let fall precisely three drops on the straw cross, and then three more cross-wise, but elsewhere they lay two straws across one another, and then jump over the cross. In other countries they catch some blood in an egg-shell, and then place shell and blood on burning coals. When the shell is burnt, the bleeding will cease. Or the blood can be mixed with a little white of a fresh-laid egg and then mixed with hot ashes, and then burnt in an egg-shell, and as the smoke arises the substance is stirred about with a white shaving, and finally the bleeding ceases. In Mecklenburg it is an odd custom for a girl who is a stranger to the family to which the nose-bleeder belongs, to spin a thread incorrectly, then to write with the running blood the given and family name of the person affected on a piece of paper, and then hang the paper with the thread around the patient's neck in such a manner that it hangs under the left axilla for the right nostril bleeding, and vice versa.

Finally, so far as *epistaxis* is concerned, omitting many prescriptions mentioned by our author, we refer to the Schwabian custom of snuffing up dried pigeon's blood or moss from the skull of a malefactor who was hanged, or holding beneath the nose the dung of an ass or grass-fed pigs, mixed with vinegar, or finally bits of alum may be passed into the nostril.

The *hearing*, if affected, can be relieved by dropping into the ears, for several mornings in succession, the juice of unripe grapes mixed with honeysuckle water.

The " Ear Worm " has from ancient times been very popular. He is supposed to crawl from the brain into the ears and make them deaf, and noisy. A very old cure for this was to hold yeast in front of the ear affected, and so to entice the worm into the passage, whence he could be extracted with needles and forceps.

For pain in the ear or earache there are innumerable remedies, amongst which we recall the oils of almon, olive, and

rose.[1] Next comes the use of warm milk, mother's milk being preferred when obtainable in the family. Then the urine of various animals enjoys great renown, that from children being preferred, though that of goats, boars, and calves is highly thought of. So too, we hear of essences from the gall-bladder of the beaver, from myrrh, the spirits of ant-hills, and the gall-bladders of the pig, bull, or mouse mixed with vinegar and then rubbed up with milk or garlic juice.

In Bavaria, pain in the ear is best relieved by the use of hot bread made into a poultice, but to be most useful the bread must have been got by begging for it. In Chemnitz a favorite remedy is a pair of old trousers tied about the head, or earth-worms and ant-hill debris boiled in Benedictine and then dropped warm into the ear. In East Prussia they tie a leek in linen and push it into the ear whilst hot. Fomentations are also highly thought of, the best being those from vermouth and cummin seed.

The Bohemians charm away an earache in this curious and unique fashion: The patient lays his head on the table, the painful ear up, and into it they place a pewter funnel with an inch or two of cold water in it. Then they melt lead and pour it into the opening three times in succession. The noise made by the explosion of the steam resounds like cannon in the ears, and a cure is soon obtained.

The same remedy can be used in tinnitus, and is then considered very useful, one noise counteracting the other. Or use is made of geranium, leek, and onion leaves compressed and the juice dropped in. The Egyptians rely on the leaves of the wild spikenard and peppermint. The Wends cut green pumpkin-stalks, and burning them, the smoke is blown into the ear.

Pliny recommends for deafness the fat of dogs mixed with vermouth, goose-fat, and onions. Or the house leek can be crushed between two flints and the juice dropped into the ears. The Bavarians think highly of old watchmaker's grease. The Schwabians think most of the gall-bladder, and they dis-

[1] In Potland and its vicinity shark's oil is much used to the present day as a popular remedy for deafness, and still more for noises in the ear; also when hot, for earache.

til it from the trout, eel, hare, or raven, with brandy, and use it hot. Or, best of all, is to find a fish inside the stomach of a pike, then to pulverize that finely, and give it two mornings in succession to the patient whilst fasting.

If any animal has crawled into the ear, the best way to get rid of him is to use the gall of a mouse mixed with oil, but if cold water has run into the ear and made it ache, the best remedy is hot goose-fat with onion juice.

When the ear suppurates, great reliance is laid on decoctions of gall-bladder with various roots and leaves. Thus spicknel with the gall of a young ox, mixed up with honey or the shell of a pomegranate added is good. Amongst the curiosities discovered in the traditions for suppuration we mention old snake-skins, fat ham, fresh donkey-dung, foam from a horse's mouth, fresh butter, tallow from the ox, fat from an ass, the gall-bladder of a he-goat, dung from a goat mixed with wagon grease, the testicle of a fox, the tripe of a hen dried and mixed with wine, the fat from a pullet, the fat from a wood-louse running out when the head is crushed, and the ashes from fresh horse-dung mixed with oil of roses, to say nothing of colt's foot juice, onion juice with rose water, or iron filings mixed with vinegar. Endless, as one can see.

Finally, we may mention as a heroic remedy (though neither aseptic nor appetizing) for suppuration from the ears, and one practised to-day in Morocco, where the syringe for cleansing the ear is compensated for by some acquaintance, who fills his mouth with oil, and then, with great skill, acquired by long practice, spits it forcibly into the affected ear.

Note by the Translator.

According to Sir William Wilde, earache is cured in Ireland by putting into the ear-canal some wool taken from the hind leg of a black ram.

In my own city, the common earth-worm is still used extensively as a heroic remedy in cases of earache, being cut into small pieces, then wrapped in fine linen, and forced into the ear-canal so as to fill it even. There it remains until the decaying matter becomes immensely offensive to the unfortunate physician, who is finally called upon to syringe it away to cleanse the ear and enable him to see what has taken place.

Finally, my little house-maid, not long since from Ireland, volunteers to me that on St. Blasius' Day, which is, I think, the 3d of February, if you have your throat blessed by the good priest you will have no sore throat for the rest of the year. Her father forgot to have his throat blessed one St. Blasius' Day, and he suffered, more or less, a whole year, in consequence of his neglect.

REPORT OF CASES OF COMPLICATIONS OF MIDDLE-EAR SUPPURATION.[1]

By Dr. CHARLES A. THIGPEN, Montgomery, Ala.

WHEN I concluded to present a paper to this distinguished society, I selected the subject of otitic brain disease. But on investigating it more closely, I found the short space of time I had at my disposal would not give me the opportunity to do the subject justice, especially when it has already been so ably presented.

It is the purpose of this paper to report a few cases of complications of middle-ear suppuration, with a view of eliciting expressions of opinions upon them, and further discussion of the subject.

Case 1.—**Empyema of Mastoid—Extradural Abscess—Operation—Recovery.**

On June 30, 1896, J. G., male, white, aged thirty-eight years, consulted me for pain in the right side of head and earache, and at the same time directed my attention to a small swelling situated behind the ear ; patient also stated that at times he would grow very dizzy. About five or six months previous to his visit to me, he had an attack of la grippe, complicated by earache, and later a discharge from his right ear, which disappeared after a few days. More recently he has had chilly sensations, followed by slight elevation of temperature. The patient presented a somewhat emaciated condition, and upon examining the region complained of, I found the following: Drum membrane lustreless and a minute

[1] Read in abstract before the American Laryngological, Rhinological, and Otological Society, Washington, D. C., May 2, 1897.

perforation in membrana flaccida, hearing distance,—watch at two feet. Inflation of middle ear successful, and no perforation whistle. His temperature was 101⅖°, pulse 100, and over a small area corresponding to the temporo-occipital suture there was slight swelling and tenderness. In the immediate vicinity of the external auditory canal, the mastoid antrum and apex of the mastoid, there was no tenderness on pressure. I attached but little significance to this swelling, thinking that it might be a small periosteal abscess, and so expressed my opinion. I advised an incision, however, as this was indicated, and at the same time I could examine the condition of the bone. This he said he could not have done without ether, so I consented to give it to him. Having moved him to the city infirmary, and all preparations made for the operation, I made an incision down to the skull, and a small amount of dark, thick, offensive pus escaped. Having sponged all pus and blood away, I examined the parts more closely, and detected a small fistula through which pus exuded. Following this with my probe, I entered the cranial cavity, and came in contact with a membranous surface ; with the gouge I easily enlarged this fistulous opening, the bone being soft, when the lateral sinus and dura were exposed. In the sulcus for the lateral sinus there was pus, which came from the mastoid, which had perforated backwards. I then opened the antrum of the mastoid, the incision being enlarged, and there found a quantity of pus and granulation tissue. The sinus was not affected, so it was left undisturbed. The wound was cleansed, and a light packing of iodoform gauze, with the regular antiseptic dressing, completed the operation, and the patient was placed in bed. He came from under the anæsthetic well, and rested comfortably until I saw him again at 6 P.M., when his temperature was 99⅗°, pulse 100, and he was comparatively free from pain. July 2d, record shows a comfortable night, with the exception of slight throbbing and aching in the region of the wound, temperature 98⅘°, pulse 88. 6 P.M., temperature 99⅗°, pulse 94, respiration 20. July 3d, 8 A.M., temperature 98⅕°, pulse 78, respiration 18. Wound was dressed, and dressings were very little soiled. Appetite began to improve, and nourishment was well taken. From this time forward patient steadily improved, and was so well on July 8th that I consented for him to return to his home in a distant part of the State. Occasional reports were favorable, and when seen six months ago was quite as well as ever, and hearing distance was normal.

This is a case where the mastoid perforated posteriorly, with an escape of pus along the groove for the lateral sinus, an extra-dural abscess in posterior cranial fossa, and subsequently a spontaneous opening externally, which nature had made along the course of least resistance, at the suture formed by the junction of the temporal and occipital bones.

CASE 2. — **Mastoid Empyema — Operation — Apparent Recovery — Three months later marked Cerebral and Pyemic Symptoms — Removal of Carious Bone and some Offensive Fluid, evidently from Meningeal Inflammation — Recovery.**

I. H., female, black, aged three years, came to my office August 1, 1896, for a pain and swelling around the ear. The mother stated that since birth there had been a discharge from the right ear, which she did not think was anything, and allowed it to take its course. A few months ago the child began to suffer from earache, and shortly afterwards there appeared a swelling behind the ear which extended downwards in the neck, and a little later an opening occurred just in front of the anterior border of the sterno-cleido-mastoid muscle, and has been discharging from this point ever since. The evidence was very plain that she had mastoiditis, and an operation was advised, which was performed the next day by my brother, who removed the entire external plate of the mastoid bone. This was all soft and readily came away by the use of the curette. The tympanic cavity was also entered, and the carious ossicles were removed. From that time until three months later she rapidly improved, all swelling disappeared, and she was thought to be well, and accordingly discharged. A short while afterwards, to my surprise, her mother called at my office and stated that the child had a hard chill the day before, and all of her clothing was saturated from perspiration ; she suffered considerably with headache, and was delirious at times. I went to see her at once, and found her with a temperature of 106⅘° pulse and respiration very rapid, and she was apparently suffering great pain. Remembering how thoroughly the diseased bone and tissues had been removed three months before, I hesitated somewhat in making a diagnosis of thrombosis of the lateral sinus, and concluded not to operate again until I was thoroughly satisfied that her case was not one of malaria. With the hope of it being the latter, I gave her a cathartic and ordered quinine afterwards. This had no effect, and she again had a hard rigor with

a sudden rise of temperature, and I was sure some acute cerebral complication was taking place. Being now convinced that a second operation was necessary, she was sent to the colored infirmary and all preparations were made. A large incision was made corresponding to the old scar from the former mastoid operation, which was joined by one at right angles extending backward for two inches. All hemorrhage being checked, the lateral sinus was exposed, and a sterilized needle introduced and some blood withdrawn. This was found to be normal, and no further interference with the sinus was made. The bone around sinus was carious and soft, and there was a small amount of an offensive serous fluid, which evidently came from meningeal inflammation. At this period of the operation the patient began to grow very weak, respiration bad, and almost pulseless, and I concluded to do nothing more. I turned my attention to the dressing of the wound, while she was held with head downward by an assistant, so that she might not die on the table. Having completed the operation she was placed in bed, the head inclined downwards, and vigorously stimulated. For two hours there was very little evidence of reaction, and I thought she would die, and accordingly left instructions with the nurse to telephone me on the moment of her death, as I wished to make an autopsy. Not hearing further from her, I made my usual evening visit, and very much to my surprise and gratification, I found the patient fairly well reacted and taking some nourishment. From this time on she made an uninterrupted recovery, and I discharged her quite well.

This case presents the following instructive points: The apparent cure of her mastoid trouble, while in the midst of health, the onset of the violent cerebral and septic symptoms, which rapidly disappeared from simply exposing the lateral sinus, by the removal of diseased bone, and the liberation of a small amount of inflammatory exudation.

CASE 3.—**Chronic Suppurative Otitis Media with Mastoid Involvement—Extradural and Cerebral Abscess—Operation—Autopsy.**

October 31, 1896, was called in consultation to see J. C., whose family physician (Dr. Seelye, of Montgomery), had given me something of his history and symptoms, and before I reached the house my diagnosis was practically made. The patient was nine-

teen years of age, and up to the previous April had enjoyed good health, with exception of colds and earache and, as the family expressed it, "risings in the head." This condition had continued, with intervals, since he was six years of age until his last attack, from which his ear did not recover, but continued to discharge, and to which he attached but little significance. More recently, he has suffered from constant headache, and at times would become very blind and dizzy, with nausea and vomiting. These symptoms were ascribed by his family to biliousness, and his ear received no attention. Notwithstanding the treatment for biliousness, he continued to grow worse, when his family physician was called in, who realized that he had some grave cerebral complication. On my first visit, I found the patient in a stupor from which he could be roused with greatest difficulty, and all questions put to him were either unanswered or very unintelligently so. His temperature was 102°; his pulse, 84; respiration, 20, and regular. Upon examination of his ears I found a very offensive discharge from the left, and the region over the mastoid painful on pressure; there were no paralyses of the ocular muscles, and the pupils responded well to light. It was my opinion that he had mastoiditis with intracranial complications, and the prognosis very unfavorable, and any procedure for his relief only speculative. His mother being a sensible woman, she readily consented to an operation, and he was accordingly removed to the city infirmary and prepared for it. On the morning of November 1st his condition was about the same as the previous afternoon; temperature, 100°; pulse, 100; respiration, 20. My intention was, first, to open the mastoid, which I found thickened and sclerosed, and which contained a small quantity of very offensive pus; next, the lateral sinus, which I exposed and explored and found healthy. I then continued my incision forward along the zygoma, to explore the middle cranial fossa, which I did by perforating the temporal bone above external auditory opening. No sooner had I penetrated the cavity than a considerable amount of dark, offensive pus escaped. With light sponging all of this was removed, and the probe passed in every direction. The dura around this point seemed firm and intact, with no evidence of further existence of pus. As patient began to grow weak, it was thought best not to continue further interference, so after completing the dressing he was placed in bed and stimulated. He reacted well, and at 1 P.M. his pulse was 100; temperature, 100°; respiration, regular. Later

in the afternoon there began a slight twitching of right side of face, which continued for twenty minutes. 6 P.M., temperature, 102°; pulse, 100; respiration, 24; recurrence of twitching; swallows with difficulty. November 2d, 8 A.M., temperature, 99⅘°; pulse, 90; respiration, 22. Twitching of right side of face continues, and patient takes very little nourishment. 6 P.M., twitching of right side of face continues, with slight convulsive movements of right arm. November 3d, the twitching of face and convulsive movements of right arm were so pronounced that I decided to open the skull over the motor area for the face and upper extremity of right side. His temperature, pulse, and respiration being favorable for further interference, he was conveyed to the operating-room at 4.30 P.M. and anæsthized. The ordinary incision for opening the cavity of the skull was made corresponding to the entire length of the fissure of Rolando, and the trephine placed over the lower one third. A plate of bone was removed, and this opening was enlarged anteriorly by the rongeur. The dura was exposed and showed no pulsation. A sterilized needle was introduced, and a thick, creamy pus was withdrawn. An incision about two inches in length was made through the dura, and about two ounces of thick, offensive pus escaped. Search was made for more in every direction, with negative results. The wound was dressed as usual, and patient placed in bed. He was some time in reacting from the operation, and no sooner had the effects of the anæsthetic passed away than violent convulsions of his entire right side began. This condition continued, with short intervals, during the entire night, and until 7.40 P.M. of the next day, when he died.

Autopsy.—Brain was removed and attention was at first directed to the region of the middle ear and mastoid. There was a small fistula through the tegmen tympani, through which pus entered the middle cranial fossa. Between the dura and the internal osseous wall there was a small space where the pus lay, which was removed at the first operation. This was securely walled in by nature on all sides. The dura was intact and firm, with the exception of a dark spot which corresponded to the fistula in the bone. Corresponding to this spot in dura and in bone there was also one at the base of the temporo-sphenoidal lobe, which was gangrenous. This was easily pushed through with the probe into a large pus cavity,

which was incised, and a great amount of thick, offensive pus escaped. This was a case of chronic middle-ear suppuration, complicated by mastoiditis, which existed for years, and later there was established a fistulous communication with the middle cranial fossa, the formation of an epidural abscess, abscess of the temporo-sphenoidal lobe, a localized purulent meningitis, and death.

CASE 4.—**Purulent Otitis Media—Paracentesis—Opening of Mastoid; no Pus found—Typical Pyæmia—Recovery.**

About December 1, 1896, J. T. G., male, white, aged thirty-seven, had an attack of la grippe, which affected the accessory nasal cavities. There was considerable constitutional disturbance and prostration. A few days after this, he began to suffer with earache and pain in the right side of head, which steadily increased in severity up to the time I saw him. Examination of the ear showed a red and bulging membrane; region behind the ear very sensitive on pressure. Paracentesis of tympanum was performed, with escape of a sero-purulent fluid, and patient expressed himself as being very much relieved. I instructed him to remain in bed, use hot applications to his ear, and warm gentle antiseptic douches in ear canal. Improvement was steady for a few days, when he began to suffer again, and nothing but opiates would relieve him. His temperature ranged from 101° to 104°, and his pulse was very rapid, and his head symptoms were so violent that I feared meningitis. I advised opening the mastoid, with the hope of finding the cause of his agony there. He readily consented to the operation, and at 4 P.M. of December 29th I did the usual operation for mastoiditis. His temperature at that time was $102\frac{3}{5}°$; pulse, 120; respiration, 24. On opening the mastoid, I was surprised to find no pus. I removed the outer wall, and sought in every direction, thinking that there might be some hidden cell filled with it, but none was found. Having promised him to open the mastoid, and no more, I did not explore the cranial cavity. The wound was dressed in the usual manner, the patient came out well from ether, and I left him in charge of the nurse. My next visit, the following morning, the patient stated that he had a comfortable night, without the slightest pain in ear or head, and from that time he has never had a recurrence of his head symptoms. But his temperature continued, ranging from 100° to 104°, and each time I saw him, he presented more and more

the aspect of a septic patient. On January 3d, he complained of pain in his left leg, but there was no redness or swelling there. The pain increased the next day, however, and on inspecting the leg carefully, a slight redness and swelling existed over the inner side, which increased in area very rapidly. Evaporating and antiseptic lotions were applied, with bandaging, which made him more comfortable. Two days later he had a slight rigor, followed by profuse sweating, and I was sure he had an abscess somewhere. On directing my attention again to his leg, I found an abscess of the cellular tissue, which I opened, and I felt sure that my patient would now recover. This opening led into a blind fistulous canal which extended as high as the popliteal space. A counter-opening was made here, and a drainage tube inserted. The patient rapidly improved for a few days, when he experienced pain in right shoulder. Upon examination I detected redness and swelling over an area corresponding to the deltoid muscle, which was also incised and treated as usual. A short while after this, he began to cough, followed later by mucopurulent expectoration, evidently from a small pulmonary abscess. The course of this case was a very prolonged one, occupying a space of over three months, being discharged well on April 1st.

A case of typical pyæmia. Aside from its origin, it presented nothing more than ordinary interest. It is of interest to otologists because of its aural origin without mastoid suppuration. Through what channels the septic matter passed, and just how systemic infection occurred we can but suppose that it was through the lateral or the petrosal sinuses.

In the management of intra-cranial complications of middle-ear suppuration, I believe we should follow the old maxim: Wherever there is pus it should be liberated, and its source sought. That if obscure symptoms mask its location, exploratory measures, when aseptically practised, can do no harm, and if there is any class of cases where early operative interference should be made, it is intracranial complications of middle-ear disease.

THREE FATAL CASES OF OTITIC BRAIN DISEASE.

By J. E. SHEPPARD, M.D., of Brooklyn, N. Y.

DURING the past year the following three cases, which seem to me to present some points of interest, have come under my care:

Case I.—**Acute Middle-Ear Suppuration—Mastoiditis—Lepto-Meningitis—Operation—Death—No Autopsy.**

Morgan L., carpenter, aged thirty-five, born in Wales, was first seen September 23, 1896.

Previous History.—As a result of bathing on July 4th last he had severe pain in the right ear followed after a few days by discharge, which continued about three weeks, and which lessened but did not stop the pain, which again increased, and has now continued with more or less severity for three and a half months, accompanied throughout by a pulsating tinnitus, at first very loud, but latterly not so troublesome. During the past week he has felt weak, has vomited two or three times, and staggers when walking. During this long period he has been under the care of two or three physicians, none of whom has recommended operation.

Present Condition.—Severe pain, which is pretty constant, and extends from the right ear to the vertex; the patient is evidently weak, and walks with a rather unsteady gate; pulse 92, with an average of one intermission in every 20 beats; temp. 98.4°; mastoid and side of head absolutely free from tenderness or other evidence of trouble; the posterior superior canal wall near the membrane is distinctly bulged; no pus in the canal; membrana

tympani opaque, not perforated, not reddened, but has a slightly pushed-out appearance of the posterior half. Hearing for the watch $\frac{0}{60}$. Tuning-fork, C″, heard louder from the vertex in the affected ear, with which it is also heard both louder and longer by bone- than by air-conduction. The diagnosis was at once made of mastoiditis, and some intracranial involvement was strongly suspected. To determine the correctness of this suspicion he was recommended to enter the Brooklyn Eye and Ear Hospital for observation, which he did. During the following twenty-four hours, up to 4 P.M., September 24th, the pulse ranged from 70 to 80; temp. 98.2° to 98.6°; eye-grounds examined and pronounced normal; the only symptom of which he complained was pain from the ear to the vertex, and this was less severe than yesterday. During the evening the pain seemed to increase, and by midnight he was somewhat delirious, with a temperature of 100.4°.

September 25th, 8.30 A.M.—Temp. 102.4°; delirious, but can be aroused to answer an occasional question; pain evidently severe; some photophobia. A diagnosis of meningitis was made in conjunction with Dr. A. C. Brush.

In view of the successes reported at the 1896 meeting of the American Otological Society from early operation in otitic meningitis, it was felt that operation was strongly indicated, even though the prognosis was grave. The mastoid cavity was first opened, and in it was found a considerable quantity of pus and granulation tissue. While curetting this out, owing to a softened internal table, the lateral sinus was opened with resulting free hemorrhage, showing the sinus to be clear. The mastoid antrum was opened, but no communication with the cranial cavity could be found. A trephine opening was then made just above the external auditory canal, when the dura was found to be distinctly inflamed, moderately bulging, but not pulsating. On opening through it the brain bulged somewhat, but seemed of fairly normal color and consistency. With the exploring needle investigation was made in several directions without finding any collection of pus. The operation, which lasted less than an hour, was well borne by the patient. During the following thirty-six hours there were several more or less general convulsions.

September 26th.—Patient semi-comatose all day; pulse 110 to 130; temp. 100° to 102°; took nourishment; passed no urine until twenty-four hours after the operation, and this upon examination was found to contain considerable albumen and a moderate

amount of sugar. Late in the evening the patient seemed to be dying, but through vigorous hypodermic stimulation with strychnia and whiskey by the house surgeon, Dr. Van Dyck, he rallied, and on September 27th seemed much better, conversing with some ease, and answering questions intelligently, showing a markedly improved mental condition ; temp. A.M. 99.4°; pulse rapid and at times of poor quality ; passed urine frequently ; marked constipation.

September 28th failed all day ; evident lack of muscular power ; pupils dilated ; pulse rapid and weak ; died at 11 P.M. Unfortunately an autopsy was not allowed.

Remarks.—In the first place, during the two and a half months the patient was under treatment before I saw him, it would seem as if there must have been symptoms demanding that the mastoid cells be opened, and the patient's death seems to me directly attributable to the unwarranted abstention from operation at that time.

In the second place, when the patient first visited me, although the symptoms were very indefinite, I believe that I was warranted in my conclusion that there was some intracranial involvement, and was warranted further in waiting for one or two days to observe the patient, and obtain, if possible, a clue as to the nature of his brain trouble. The thirty-six hours' delay at that time did not in my judgment contribute to his death.

In the third place, in the light of experience gained then and subsequently, I believe I should, in spite of the meningitis found at the first opening of the skull, have investigated further into the condition of the posterior fossa, particularly with the view of finding whether or not a cerebellar abscess existed.

A further question, suggested to me by some who saw the case, is as to the share the kidney condition may have had in his death. This question arises from the presence of albumen in his urine, and from the improved mental condition the day before his death, suggesting a subsidence of the meningeal inflammation. This question seems to me a difficult one to answer, though my own judgment is that the cause of death was the meningitis due to the mastoid cells not having been operated earlier in the course of the disease.

CASE 2.—**Chronic Middle-Ear Suppuration—Mastoiditis—Epidural Abscess—Meningitis—Operation—Death—No Autopsy.**

Henry C., aged seven years, came to my office January 6, 1897.

Previous History.—The mother says that the boy has always been delicate; that his right ear commenced discharging during dentition; that this was worse after scarlatina when he was three years old; that when he was four years old he was under my care for some time at the Brooklyn Eye and Ear Hospital, when I treated him for chronic middle-ear suppuration (as shown by the records); that since then there has been occasionally a small amount of pus in the ear. This attack dates back one week, according to the mother's account, when he commenced to have pain in the right ear with increased discharge, the pain remaining in the ear until yesterday, when he complained of headache in both the frontal and occipital regions; three days ago, and again this morning, he vomited; has seemed drowsy, but sleep is restless; two or three times there has been slight delirium; has had "high fever," but no chills.

Present Condition.—Pulse rapid and weak; temp. 100°; head drawn markedly and rigidly backward; pupils slightly enlarged, sluggishly responsive to light; eye-grounds, as reported upon by Dr. Simmons, about normal; patient says bright light hurts his eyes; no external evidences of mastoid trouble, but the mastoid is markedly tender; auricle normal; external auditory canal filled with very offensive pus containing one or two cholesteatomatous masses, and the posterior wall markedly bulged; the membrana tympani perforated in the posterior inferior quadrant, the perforation being partly blocked by cholesteatomatous matter; attic region much bulged.

In this case it seemed to me so clear that a general meningitis existed that I advised against operation as being useless, telling the parents at the same time that if they and the family physician requested it, I would operate so as to give the child whatever chance such a procedure offered. Dr. J. F. O'Connell saw the child and strongly urged an operation, which was accordingly performed later in the day.

On account of the bulging of the attic region, and in order to drain it, a very carious malleus was removed as the first step, then the mastoid antrum was opened in the usual manner and found to be filled with granulation tissue and cholesteatomatous material, all of which was cleared out; when the first button of bone was

removed, excessively offensive pus welled up into the opening; which was found to come from an epidural abscess in the immediate region of the lateral sinus. The parts were carefully cleansed and dressed with iodoform gauze. During the operation both the pulse and respiration became very poor, but responded to hypodermic stimulation.

January 7th.—Slept better last night than for several nights previously; pulse 80 to 110; temp. [per rectum] 101.5° to 102.4°; neck not so much retracted as yesterday, but cries out frequently from the pain in his head, which seems to be frontal; pupils equal but rather large and sluggish.

January 8th.—Pulse 78 to 90; temp. [rectal] 101.2° to 103.°; cries out with pain in head, which seems worse in the right frontal region; had a fairly comfortable night; no vomiting; no muscular twitching; answers questions with apparently full intelligence; wound dressed this morning; no pus present; marked motion of brain with respiration, but apparently none with the pulse; during the afternoon he became partially comatose, the coma increasing during the night, and accompanied by muscular twitching, but no general convulsion.

January 9th.—Died at 11 A.M.

Remarks.—About three months later I learned quite accidentally that the parents of this boy had been strongly urged by their physician to bring him to me five days before they did. At that time there was no retraction of the neck muscles nor other distinct evidence of a general meningitis, so that this death seems attributable to delay on the part of the parents. The case proved to be a favorable one for operation, the epidural abscess being within rather easy access, and experience with other cases gives reasonable ground for thinking that a cure might easily have resulted from earlier operation.

CASE 3.—**Recurrent Middle-Ear Suppuration—Mastoiditis—Epidural Abscess—Meningitis—Two Operations—Death—Autopsy.**

Charles K., aged twenty-two, came to me on account of his final illness May 15, 1897.

Previous History.—My first acquaintance of the case was made in May, 1893, when I treated him for chronic middle-ear suppuration on both sides, and deflection of the nasal septum. At that

time there had been frequently recurring suppuration in both ears since infancy, each attack being preceded for two or three days by pain. Both canals were filled with offensive pus. There were large posterior perforations of both membranes and some granulation tissue along the posterior walls of the tympanic cavities. With less than a month's treatment, during which nasal respiration was restored, the ears had ceased discharging.

The patient then left for Europe and was not seen again until November 15, 1896; he said that during this 3½ year's interval nasal respiration had been perfect, and that he had had absolutely no trouble with his ears until a week ago, when he commenced to have slight pain in, and discharge from, the left ear. There was some pus and cholesteatomatous material in the canal. Under treatment the pain and discharge ceased in a week's time, after which he was not again seen until May 15, 1897, when he said he had had no trouble with the ears until one week ago, when the left ear began to feel stopped up and slightly painful, together with considerable pain which he located in the occipital region, and at the same time there was as he expressed it a seeming inability for brain work, difficutly in collecting his thoughts, and especially did he have trouble with his memory. During the past three days the ear has discharged, and the head has felt better.

Present Condition.—Canal contains watery pus, and on using the syringe considerable cholesteatomatous material comes away. The same posterior perforation exists, the opening leading up toward the attic and antrum. The membrane over the attic is quite red and very tender.

May 19th.—When he was next seen, he says that since last visit there has been considerable watery discharge; pain [not severe] in and around the ear; to-day has felt feverish, and by no means well at any time since last visit; sleeps poorly; there is slight but unmistakable tenderness over the region of the antrum; the membrane and surrounding parts are more inflamed than last time, but no retention of pus; this evening temp. 101.1°; pulse 108; patient was ordered to stay away from business.

May 20th.—Feels in a general way better; has a sore feeling and some pain in the ear; tenderness over antrum the same as yesterday, slight but unmistakable; semi-watery discharge; temp. 99.8°; pulse 96.

May 21st.—Temp. 99.8°; pulse 96; other symptoms unchanged.

May 22d.—Temp. 98.4° ; pulse 90 ; other symptoms unchanged.

May 23d.—Temp. 98.4° ; pulse 90 ; the inner end of the canal grows redder, and what looks like beginning drooping of the posterior superior wall.

May 24th.—This drooping has increased ; moderate pain ; tenderness over the antrum has slightly increased ; operation was undertaken in the afternoon. After chiselling through an intensely hard sclerotic bone, a few drops of pus were found near the antrum ; in which to my surprise there was no cholesteatoma ; a necrotic malleus was removed, the incus on account of the free hemorrhage not being found ; applied the usual dressing.

May 25th.—Head feels dull and pretty sore, but is free from pain ; temp. 101.4° ; pulse 80 ; vomited for sixteen hours after the ether.

May 26th.—Temp. 103.4° ; pulse 86, full and hard ; complains of a severe "thumping" pain at the vertex (not over the side of head) ; eyes not sensitive to light.

May 27th.—3 P.M., temp. 103° ; pulse 86 and more natural ; head feels much better, being free from the "thumping" of yesterday, and almost free from pain ; no photophobia.

May 28th.—5 A.M., had a very restless night with much fever ; temp. 104.8° ; pulse 90 ; again has the thumping at the vertex and some pain ; no vomiting ; no photophobia ; wound dressed ; looks clean and healthy. 4.30 P.M., temp. 103.9° ; pulse 94 ; no headache, and no thumping.

May 29th.—6.30 A.M., temp. 104.6° ; pulse 110 ; no pain in head ; no eye symptoms. 12 M., temp. 104.4°. 6.30 P.M., temp. 104° ; pulse 90 ; has had a fairly comfortable day, without headache. At 10 P.M. I was called, and found him actively delirious, but this soon passed away. 11 P.M., temp. 103.4° ; pulse 110.

May 30th.—3 A.M., temp. 101.4°. 10 A.M., 104.4° ; pulse 120. Pupils active ; moderate headache. 3 P.M., temp. 104.4° ; pulse 128 ; no headache ; mind fairly clear. At this time he was seen in consultation by Drs. H. Knapp, of New York, and Wunderlich, of Brooklyn. The eye-grounds were examined and found to be normal. The opinion was that the condition was probably due to an epidural abscess with commencing meningitis, and the recommendation was that, unless there were improvement in twenty-four or forty-eight hours, an exploratory opening of the cranial cavity should be made.

May 31st.—8.30 A.M., temp. 103.2°; pulse 120; mind fairly clear; no headache; slept fairly well last night and to-day. 12 M., temp. 104.° 6 P.M., temp. 103.4°; pulse 116; no headache.

June 1st.—8 A.M., temp. 103.9°; pulse 116; somewhat delirious through the night, but his attention is easily attracted so that he can talk rationally; no headache; says the light hurts his eyes a little. 12 M., temp. 104.6°. During the morning, the temperature having risen, the pulse ranging from 120 to 130, and respiration having become rapid and irregular, it was decided, with the approval of Dr. Wunderlich, to operate as recommended by Dr. Knapp. At 4 P.M., Drs. Wunderlich, Alderton, and Simmons assisting, the cranial cavity was opened just above the external auditory canal, the gouge and rongeur being used; no pus was found; the dura was distinctly inflamed; the portion of bone overlying the tympanic cavity was investigated, and no bare bone or pus found; the aspirator was then used in several directions into the brain substance, but with a purely negative result; another opening was made posteriorly for investigation of the posterior fossa and cerebellum, but nothing was found save an inflamed dura. After the operation, pulse 150 to 160; temp. 102.6°; 10 P.M., pulse 158; temp. 103.8°; partially conscious.

June 2d.—8 A.M., condition through the night and this morning not much changed, except that the patient is evidently weaker. Died at 12 M. During yesterday and to-day, at frequent intervals, there was right-sided internal strabismus. No convulsion except a partial one lasting but a moment while under ether yesterday. Just before the last operation the eye-grounds were again examined by Dr. Simmons and pronounced normal.

Autopsy, June 3d, by Dr. J. M. Van Cott, the head only being examined. Found lepto-meningitis of both base and convexity, that of the base being more on the left side. All sinuses free from clot. *At the apex of the petrous portion of the temporal bone there was an epidural abscess in the immediate region of the foramen lacerum medium*, which had extended toward the median line so as to involve the pituitary body. The bone was much softened about this region, the softening involving the walls of the carotid canal, so that, although the bone could not be removed for further examination, the inference seems to be almost beyond question

that the infection extended inward from the tympanic cavity along the carotid canal, the abscess having its centre at the point where that canal enters the cranial cavity.

Remarks.—Cure by operation of an epidural abscess in this region, so near the centre of the head, seems to me to be beyond the power of our present resources.

Prevention, it seems to me, might have been a possibility by removing the remains of the membrana tympani and the two larger ossicles when the case was under treatment previous to his last illness, *e. g.*, when in 1893 he first came for treatment with the history of recurring discharge the greater part of his life. This, however, would have been contrary to the established rules of treatment, which require in such suppurative cases a preliminary course of treatment by simpler measures, which so often, as in this case, result in cessation of discharge and apparent cure. A relatively short course of treatment resulted in stopping all symptoms referable to the ear for three and a half years, when a slight recurrence again yielded to three treatments, to be followed six months later by the fatal recurrence. The fact remains that the more radical treatment of the case when first seen might have been the means of averting the final fatal attack, and, to my mind, opens the question for our serious consideration, whether it would not be wiser treatment in all long-standing cases to remove whatever membrane remains, together with the larger ossicles, especially since this method, as a rule, rather helps than impairs the functional usefulness of the organ.

THE CENTRAL ACOUSTIC TRACT AND ITS INVOLVEMENT BY TUMORS OF THE MID-BRAIN, ESPECIALLY OF THE CORPORA QUADRIGEMINA AND THE TEGMENTUM.

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Translated by Dr. Arnold H. Knapp, New York.

(With seven illustrations.)

I.—INTRODUCTION.

According to the classification of Nothnagel[1] and Bernhardt,[2] and to the publications which have hitherto appeared, disturbance of hearing occurs in tumors of each of the five parts of the brain: the medulla oblongata (after-brain); the cerebellum and pons (hind-brain); the corpora quadrigemina and crura cerebri (mid-brain); the optic thalami (inter-brain); and certain regions in the cerebral hemispheres (fore-brain).

The most frequently observed, and therefore the better known, are the disturbances of hearing in affections of the cerebellar hemispheres and the pons; in these cases the acoustic tract itself is directly involved by the tumor, and the deafness is generally on the same side as the tumor. Crossed deafness occurs more rarely, and is due to a lesion in the regions of the cerebrum surrounding the Sylvian fossa.

Up to within a few years, deafness has been but little noted in affections of the thalamencephalon and the mesencephalon. Nothnagel does not mention it in the part on diagnosis of affections of the corpora quadrigemina, although in two of his collected cases disturbance of hearing is men-

tioned. In one of these (Gowers [3]), the impairment of hearing occurred during the period of observation, and Gowers refers the impairment to a lesion of the crossed tegmental region found at autopsy. In the other (Duffin [4]), the connection between the brain tumor and the deafness remains unexplained, owing to insufficient observation. In his last publications, Nothnagel [5, 6] considers the atactic gait, and the external, asymmetrical ophthalmoplegia as alone of pathognomonic value among the symptoms of disease of the corpora quadrigemina, and regards all other appearances as complications or of secondary value.

Among fourteen cases of tumor of the corpora quadrigemina (including the pineal body) collected by Bernhardt,[7] there were four cases with deafness. Based on these observations, Hartmann says, in his text-book on *Diseases of the Ear*, fourth edition, 1889, page 244: "In the region of the intersection of the crura cerebri, in the region of the corpora quadrigemina, are situated the nuclei of the third and fifth nerves; therefore, when these areas are affected, deafness occurs in conjunction with strabismus and diplopia, with xerosis of the cornea, with trigeminal neuralgia, and paralysis of the muscles of mastication." The author continues with justice: "Unfortunately, up to the present time, disturbance of hearing has received too little attention at the hands of the neuropathologists, and from the examinations of the above cases we can draw but few conclusions." In 1894, A. Schrader,[8] at the suggestion of Hitzig, collected fourteen cases of affections of the crura cerebri (apoplexies, softenings, tubercles, gliomas, gliosarcomas); in only one of these (Mohr), where the tubercular process had extended into the substance of the corpora quadrigemina and the optic thalami, deafness was noted. From this small number of observations, it seems that affections of the crura cerebri alone do not involve the function of the central auditory tract, a supposition which has been confirmed by all of the more recent clinical investigations: Leube,[9] Raymond et Artaud,[10] D'Astros,[11] and others.

A. Christ,[12] in 1890, added to our knowledge of this subject by the publication of a case of sarcoma of the corpora

quadrigemina, together with a grouping of thirty similar cases. This patient became deaf during his stay in the hospital. Through the kindness of Professor Immermann, I had repeated opportunity for examination, and I was enabled to obtain both temporal bones after death in a fresh condition. It was this unusual opportunity which led me to study this subject. Christ found deafness noted eleven times in the thirty cases. As after death the region of the primary nuclei and acoustic tracts were found entirely normal, this author is inclined to agree with the conclusions which Steinbrügge arrives at, after the recent examination of a similar case where deafness was supposed to be due to increased perilymphatic pressure in the labyrinth. On the other hand, Weinland, in *Archif für Psychiatrie*, vol. xxvi., endeavors to show that *deafness in tumors of the corpora quadrigemina is due to a direct involvement of the central acoustic tract.* This author,[14] in a case of monolateral tumor of the corpora quadrigemina where progressive deafness was found in the opposite ear (a thorough functional examination, however, was not made), examined the base of the brain in serial sections, and found, beside other changes, a degeneration of the lateral fillet, and the brachium of the posterior corpus quadrigeminum. This observation, and a study of seventeen cases collected from the literature, leads him to the conclusion: "Affection of a posterior corpus quadrigeminum causes deafness in the crossed side." He attempts to explain the fact that in half of the cases no deafness was found by two suppositions: either that the tumor did not involve the lateral part of the corpora quadrigemina under which the lateral fillet passes, or that there is an error in observation. Thus Weinland's views are directly opposed to those of Nothnagel and also to Lichtheim,[15] who thinks that only ocular paralyses and disturbance of equilibrium are of diagnostic value in tumor of the corpora quadrigemina, and that the deafness observed by some authors is due to indirect symptoms or to accompanying disease.

The most recent papers on tumors of the corpora quadrigemina are in accord with the views of Weinland. Frankl-

Hochwart,[16] in the cerebral disease of the acoustic nerve, states that deafness is well known in affections of the corpora quadrigemina, and he even speaks of quadrigeminal deafness. Oppenheim,[17] page 122, says: "It can no longer be doubted that deafness is a focal symptom in tumors of the corpora quadrigemina."

I have endeavored to enlarge and complete the study of the cases collected by Weinland and have brought the same up to the beginning of 1896. My results are not ambiguous and confirm the opinion of Nothnagel and Lichtheim to the extent that destruction of the lamina quadrigemina alone causes no deafness, and that to interrupt the central acoustic tract a lesion is necessary in the parts situated more ventrally in that region, especially in the lateral tegmentum, including the brachia of the post. corpora quadrigemina.

2.—TOPOGRAPHICAL ANATOMY OF THE MID-BRAIN.

The mid-brain can be described as that part of the base between the third and fourth ventricles which contains the Sylvian aqueduct. It is composed of two parts: the quadrigeminal and that of the crura cerebri. Each crus consists of a pes or crusta and a tegmentum. The tegmental part of the pons is the direct caudal continuation of the tegmental part of the crura and is situated between the dorsal layer of true fibres of the pons and the floor of the fourth ventricle. A transverse plane through the entire canal of the Sylvian aqueduct (see Plate I), divides the dorsally situated quadrigeminal plate (the quadrigeminal elevation of Bechterew), from the so-called tegmental region. On the ventral side of the base of the brain, in the region of the anterior corpora quadrigemina, are situated the crura cerebri (see Fig. 4); in the post. part of the quadrigeminal plate the proximal end of the

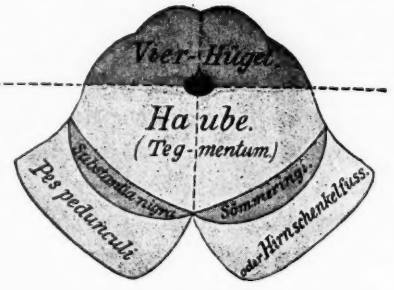

FIG. I.

Diagrammatic section through the mid-brain at level of ant. corpora quadrigemina.

pons appears (Figs. 2 and 3). The quadrigeminal plate and tegmentum appear in almost all of the cross-sections of the mid-brain; in the posterior sections through the post. quadrigeminal bodies the pons appears, while in all of the sections through the ant. bodies the crusta is seen on the ventral surface. The brachia of the corpora quadrigemina are situated principally below the quadrigeminal plate in the lateral region of the tegmentum; the posterior one, which runs toward the corpus geniculatum mediale, contains in addition a portion of the central auditory tract. The pineal body, or conarium, arises in the post. commissure of the third ventricle and rests upon the anterior quadrigeminal bodies. Phylo-

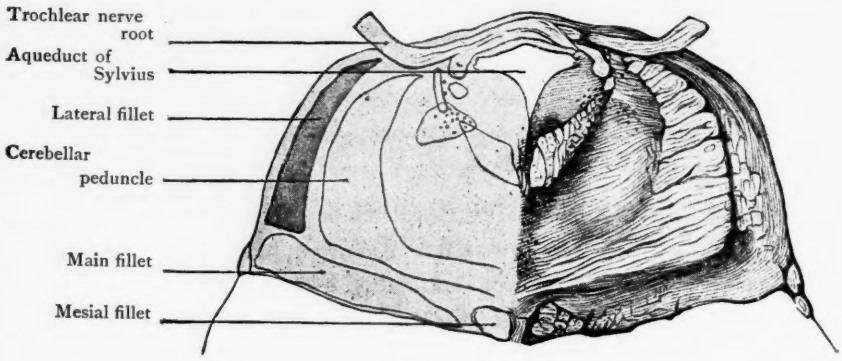

FIG. 2.

Section through posterior part of mid-brain after Obersteiner.

genetically it must be considered as the atrophied parietal eye. This structure is unusually prone to tumor formation, partly benign, partly malignant in nature, which either compresses or passes directly into the corpora quadrigemina. The quadrigeminal region (see Fig. 6) is covered posterially by the culmen of the cerebellum, anteriorly by the splenium, the lower and median surface of the cerebral hemispheres, by the gyrus fornicatus at its junction (isthmus) with the occipital and temporal lobes and by a small part of the latter two lobes, (see Figs. 5 and 6). In all of these structures surrounding the corpora quadrigemina tumors have been observed and described which have either led to disease of the corpora quadrigemina or reversely have originated in the corpora quadrigemina.

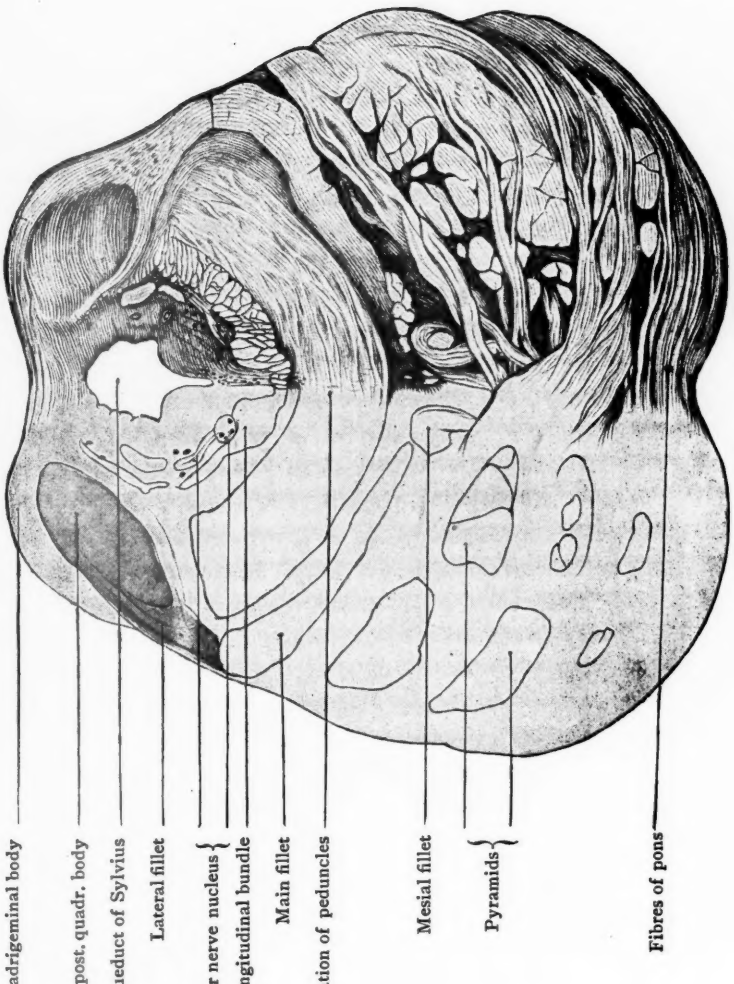

FIG. 3.

Section through the post. corpora quadrigemina (Obersteiner).

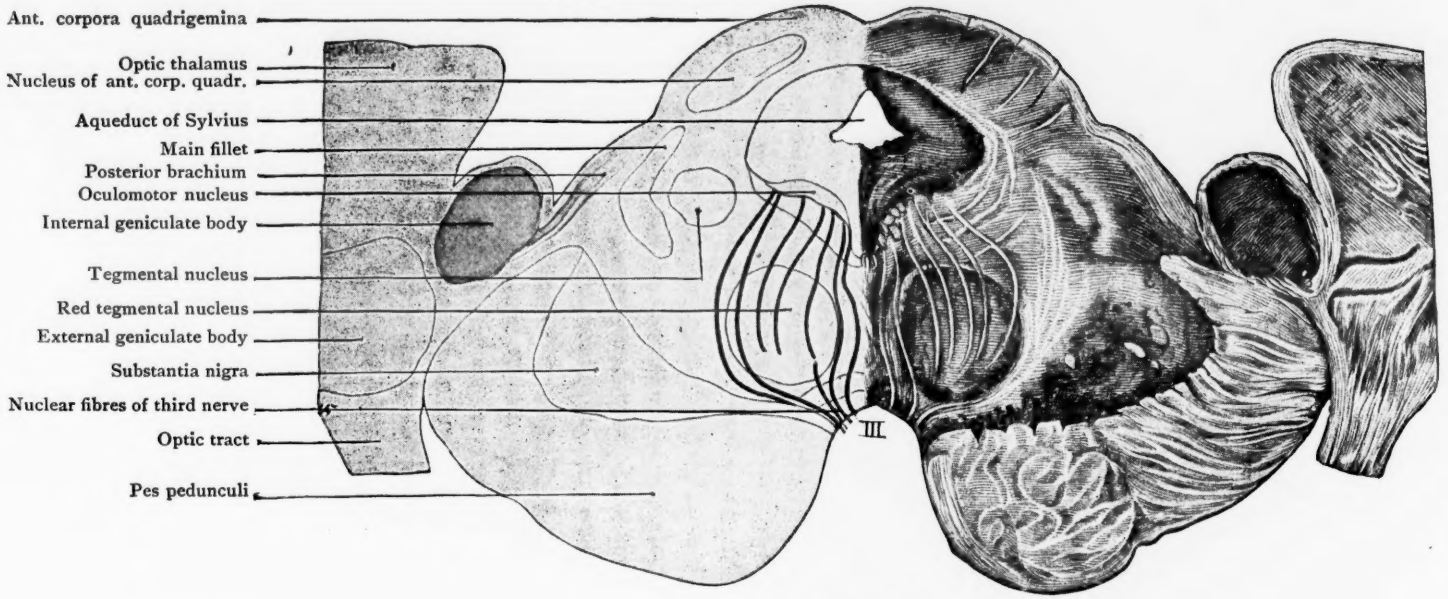

FIG. 4.

Section at level of ant. corpora quadrigemina (Obersteiner).

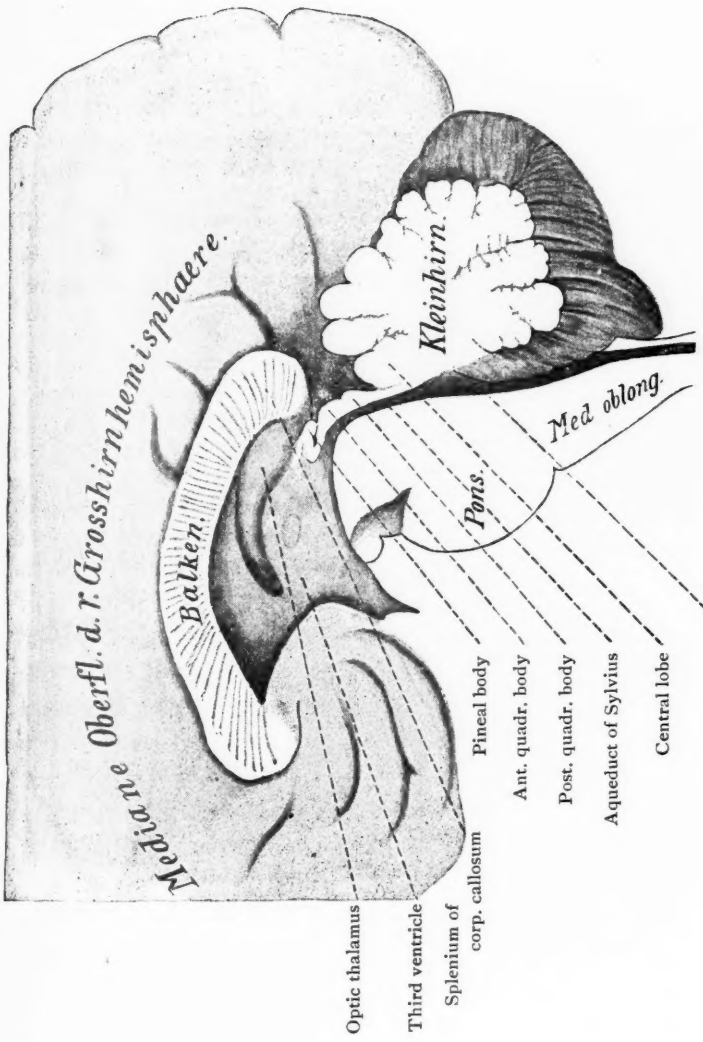

FIG. 5.

Median section through the brain.

Of the fibres and the ganglia of the mid-brain which are of especial interest to us, we may mention the fillet, the nuclei of the third and fourth nerves and of the corpora quadrigemina, as well as the peduncles and the pyramidal tracts which travel in the crura cerebri and in between the fibres of the pons. The arrangement of the fibres in the fillet can be seen at the level of the trochlear nerve nucleus to consist of three separate bundles which all travel in the cortical zone of the field. A lateral part, the lateral fillet, forms the exteral limit; the main fillet (Bechterew) and the

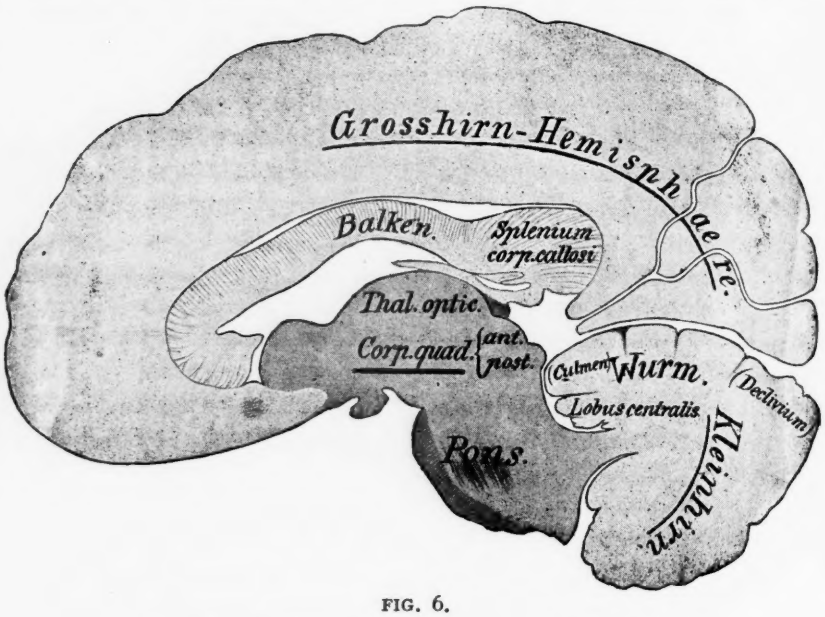

FIG. 6.

Sagittal section (2-3 *mm* from the middle plane), from Déjerine.

mesial fillet (nearer to the middle line) are situated dorsally. All three divisions are bounded internally by the superior peduncle of the cerebellum. The nuclei and roots of the fourth nerve are situated at the side and in the roof of the Sylvian aqueduct. At the level of the posterior corpora quadrigemina (Fig. 3), the fibres of the lateral fillet appear to approach and to enter the nucleus of the corpora quadrigemina. The two largest bundles of fibres of the peduncles coming from the cerebellum decussate in the middle line. The anterior nuclei of the fourth nerve are

situated to one side of and in the floor of the Sylvian aqueduct, and adjoin the posterior longitudinal bundle (fasciculus longitud. post.). A transverse section through the ant. corpora quadrigemina (Fig. 4) shows the crura cerebri, the brachia of the post. corpora quadrigemina and their continuation to the corpus geniculatum internum and to the nucleus of the anterior corpora quadrigemina, the nuclei and nuclear fibres of the third nerve, the red tegmental nucleus, the posterior part of the optic thalamus, as well as the corpus geniculatum externum with the nuclear fibres of the optic nerve.

Of these tracts, the large sensory, nucleated tract of the fillet is of the greatest importance to the otologist. Its re-

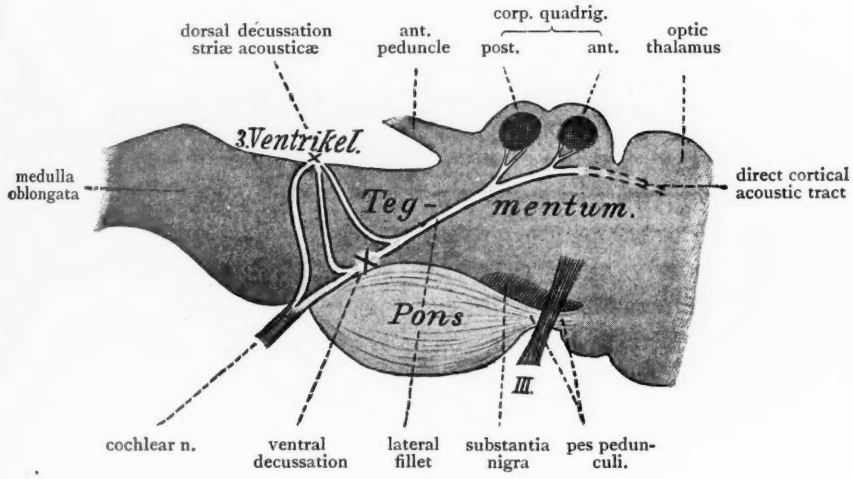

FIG. 7.

Central acoustic tract (diagrammatic).

lations to the auditory nerve, to the quadrigeminal bodies, to the corpus trapezoides, and to the upper olive have chiefly been investigated by Roller[18, 19]. The main portion, the upper fillet, which Bechterew recently named the main fillet (*Arch. f. Anat. und Physiol.* anat. Abthlg., Heft 4–6, 1895), extends through the entire base of the brain to the optic thalamus, in small part also directly to the cerebral cortex. It presents in general the central continuation of the posterior columns of the cord. The motor tracts (facial,

hypoglossal) are situated in the mesial fillet. The central acoustic tract runs in the lateral or lower fillet, which extends from the level of the upper olive to the quadrigeminal nuclei, sending a few fibres direct to the frontal cortex (Held).

The primary acoustic centres in the brain have long been known. Our knowledge of the central acoustic tract has greatly advanced during the last ten years by the combination of various new methods of research: the methods of Golgi, Weigert, and Pal; the examination in the various developmental stages (Bechterew); especially, however, by Gudden's method.

The central course of the vestibular nerve is even to-day but little understood. The course of the cochlear nerve is much better known, mainly through the investigations of Roller,[18, 19] Flechsig,[20, 22] v. Bechterew,[23, 25] Monakow,[29, 31] Forel-Onufrowicz,[27] Bumm,[33] Baginsky,[28] Kirilzew,[32] Oseretzowsky,[34] Cramer,[35] and, finally, by Held,[36] Kölliker,[37] and Bechterew.[25]

The primary central stations of the cochlear nerve are situated on both sides in the posterior part of the pons. Each is composed of two, not sharply-separated, collections of ganglionic cells, the one, dorsal (the acoustic tubercle), and one, ventral, the anterior or accessory acoustic nucleus. *The acoustic tracts extend from these primary auditory centres; in the tegmentum most of the fibres decussate upwards to the lateral ventral part of the quadrigeminal region, and then pass through the brachia and the internal geniculate bodies beneath the posterior part of the optic thalamus to the internal capsule, and finally reach the cortex of the temporal lobe.* The course of the fibres is not uncomplicated, and is difficult to study, because all fibres do not travel the same path, but separate, and later unite again to a large extent. The tracts and their branches travel crossed, and others uncrossed, and the semi-decussation may take place at entirely different places, as dorsally in the acoustic striæ, ventrally in the trapezoid body. Even to a greater extent than in the other central tracts does the acoustic tract split up into a number of neurones, *i. e.*, the fibres are interrupted for distances by the

introduction of large ganglionic masses, and these send out beside the cortical tract a number of reflex tracts.

Held[36] distinguishes in this way three systems: System I. is that collection of fibres which pass from the cochlea directly and without interruption partly to the anterior acoustic nucleus, partly to the tuberculum acusticum; a small part continues to the upper olive, trapezoid nucleus, the nucleus of the lateral fillet, and even more centrally. System II. comprises the greater portion of the central auditory tract. According to Held, it commences in the primary terminal stations of the System I., and passes to the posterior corpora quadrigemina. The greater part decussates, a smaller part continues on the same side. In this path from the primary centres to the quadrigemina, additional fibres arrive from the upper olive, the trapezoid nuclei, and the nucleus of the lateral fillet (corpus parageminum, Bechterew), and also, at successive stages, certain fibres from the primary centres cease. Centrifugal fibres, so-called retrograde System III., follow the same tract with the Systems I. and II.

The greater part of the lateral fillet terminates in the posterior, another part in the anterior, corpus quadrigeminum, by becoming lost in the ganglionic mass, either directly or after decussation (dorsally and ventrally to the Sylvian aqueduct). A small part only of the centripetal fibres passes directly upwards and generally through the lower corpus quadrigeminum to the corresponding brachium, and, further, through the regio subthalamica to the posterior part of the internal capsule, and, finally, to the cortex of the temporal lobe (a smaller portion, which Held also considers a cortical tract, reaches the brachium on the median side). This cortical acoustic tract, especially the part from the posterior brachium, is joined by a system of fibres whose axis-cylinders arise from the posterior corpora quadrigemina.

In addition to this small cortical tract the quadrigeminal region contains a large system of reflex acoustic tracts which are in close connection with the quadrigeminal nuclei. Optic fibres terminate in the large ganglia of the superficial portion of the anterior quadrigemina (Ramon y Cajal, Van

Gehuchten); in the middle and deeper gray of the anterior, corpus quadrigeminum are situated the terminative of the fibres of the lower fillet, as well as the origin of the fibres which Held regards as reflex tracts. The fibres pass in the direction of the surfaces of the quadrigemina to the above mentioned ganglia and thus connect with the optic nerve; others descend in the lateral tracts, inclining to the medulla after they have sent collateral branches to the third-,fourth-, and fifth-nerve nuclei (posterior longitudinal bundle). Additional reflex paths pass from the trapezoid nucleus to the seventh-nerve and sixth-nerve nuclei of the same side. We may omit these secondary acoustic centres in the trapezoid body, in the upper olive, and the nucleus of the mesial fillet, as they belong to the region of the pons, and consequently not in the scope of this paper.

To return to the consideration of the fibres and nuclei which are in relation to the central acoustic tract in the midbrain and which would be involved in a lesion of the latter, we find dorsally the mesial fillet which is in connection with the posterior spinal columns, and is one of the most important sensory tracts; in it pass (Flechsig, Bechterew) the cortical tracts of the non-motor cranial nerves. The cerebellar peduncles are situated more dorsally and medially (Figs. 2 and 3), which anteriorly continue in the red nucleus (Fig. 4) and complete the connection of the cerebellum with the cerebral cortex; its injury at the level of the red nucleus (Starr [68], Barth [69], Kolisch [70], Scarpatetti [71], etc.) and of the peduncular decussation (Eisenlohr [67]), produces cerebellar ataxia. The posterior longitudinal bundle (Fig. 3) is situated more anteriorly and nearer the middle line, though still within the tegmental area. This is probably a sensory-motor reflex tract, and connects, as above stated, the nuclei of the third, sixth, fourth, (and fifth ?) nerves, and also is closely related posteriorly to the anterior and lateral tracts of the cord, and to the gray matter of the pons. The fibres of the nucleus tegmenti (see Fig. 4) originate in the latter. Held (*l.c.*, 265) thinks that there is a reflex centre of the auditory nerve for respiratory movements and vascular innervation in this area. At the upper limit of the tegmentum, below

the anterior quadrigeminal bodies, the three nuclear groups of the third nerve are situated in the floor and sides of the gray matter surrounding the aqueduct; the nuclear fibres of this nerve are situated ventrally to this and run in the crural tegmentum through its entire extent.

The decussated nuclear fibres of the fourth pair are situated in the roof of the aqueduct, below and posterior to the posterior quadrigeminal bodies (Figs. 2 and 3), while the floor and the lateral walls contain the nuclei.

If tumors in the anterior quadrigemina extend to the contiguous posterior end of the optic thalamus and down toward the anterior end of the crura, both the geniculate bodies and the optic tract become affected. We have intimated above that the destruction of the internal geniculate body causes a disturbance in the auditory function. The physiological importance of the external geniculate body as a primary centre of the optic nerve is acknowledged. Rarely are the crura directly injured by tumors starting in the quadrigeminal region, as death occurs before the tumor extends far in depth; it is more frequent to observe an extension (tubercular tumors) in the opposite direction from the ventral to the dorsal surface of the mid-brain (Mohr[8], and Paquet, *Bulletin de la Soc. Ant.*, 1864). It is unlikely that the symptoms of motor and sensory irritation in the extremities which are frequently caused by tumors in the quadrigeminal region are the result of direct injury of the pyramidal tracts, because these symptoms may all be caused reflexly from the tegmentum, as has been proved by the experiments of Ziehen.[73] The mesial fillet passes in the proximal part of the pons through the dorsal-median part of the tegmentum, and farther above approaches the crura cerebri. According to Bechterew, this tract contains the cortico-bulbar bundle of the facial and hypoglossal nerves; its injury is not uncommon.

3.—EMBRYOLOGY, COMPARATIVE ANATOMY, AND EXPERIMENTAL PHYSIOLOGY OF THE QUADRIGEMINAL AREA.

The function of the quadrigeminal region is much less understood than the morphology. The results of animal

experimentation cannot be applied directly to man, because the quadrigemina in man are less developed, and consequently are of less importance. Longet [4] has made the most extensive comparative-anatomical investigations, and measurements on the subject, and says, p. 460: "l'homme est de tous les animaux vertebrés celui qui présente les tubercules quadr. à leur minimum de développement." In the early embryonal periods the mid-brain is formed by a rather wide space of the medullary tube (whose position at the end of the first month corresponds to the cervical flexure). It then remains backward in the further development, and in the fourth to fifth month is covered over dorsally by the cerebral hemispheres and the cerebellum. Phylogenesis teaches us that in the lower vertebrates, even in later life, conditions exist which are similar to those of the higher vertebrates in the embryonal state. In these the mid-brain occupies a much greater part of the brain than in mammals, and, in man, *the ganglionic mass of the quadrigeminal plate appears as a relatively dwarfted organ.* The lower we descend in vertebrates, the larger space do the quadrigemina occupy. In the reptiles, they are larger than the cerebellum; in birds, they form a pair of lobes (lobi optici), which are even larger than in the reptiles. Finally, in fishes, especially in bony fish, they form the largest part of the brain. Solid, *i. e.*, without ventricular extension of the aqueduct, are only the quadrigemina of the mammals.

It is an important fact that in the lower animals this enlargement is only in the anterior quadrigeminal bodies, while the posterior pair are contracted to a scarcely visible ganglion in the back part of the lobus opticus. In the mammals, the posterior quadrigemina increase to the size of an independent structure, and almost equal the anterior pair. *This increase in size of the posterior corpora quadrigemina in animals remains of equal degree symmetrically commensurate to the development of the auditory organ.* Spitzka [77] found that the length of the cochlear canal was proportional to the volume of the posterior quadrigemina. As regards animal experimentation, Serres [38] found with Ro-

lando that injury of the lobi optici in the three lower classes of vertebrates was regularly followed by diminution of vision and reflex dilatation of pupil on the opposite side. In agreement with the results of experiments on mammals, Serres found in man (four cases with autopsy) never any changes in vision, but regularly disturbance of co-ordination, epileptic attacks, choreic conditions, and in one case also aphasia and anomaly of the third nerve (interior and external muscles). There is no mention of any loss of hearing. Desmoulin [39] arrived at similar results to Serres, except that in the frog representing the amphibia, blindness occurs on the operated side. Flourens [40] and Longet [41] also believe to have found, contrary to Seroso, that the quadrigemina are surely an optic centre in the vertebrates. The latter cites the clinical and pathological observations of Gall, Vrolik, Magendie, Lélul, and Jobert. Flourens and Longet found that stimulation of a corpus quadrigeminum caused contraction of both pupils. Longet concludes with the remark that the function of the quadrigemina was not completely known, and we must wait for new physiological experiments and examination of pathological cases. Recent investigators (Adamück,[42] Schiff,[57] Beaunis, Hensen and Völkers,[58] and Ferrier [43]) have not had more success with their experiments, a fact which is readily explainable by the proximity of the third- and fourth-nerve nuclei, the optic centres, and the posterior longitudinal bundle. The experiments of Ferrier have shown the existence of a centre for the co-ordination of eye movements in this region. Bechterew ("Ueber die Fünction der Vierhügel," *Pflüger's Archiv*, Bd. xxxiii.) observed hemianopsia after removal of anterior quadrigemina; after destruction of the posterior, the disturbance of sight is a more complicated one. The conclusions of the above-named French authors in regard to the disturbance of equilibrium after removal of the quadrigeminal bodies were confirmed by Goltz (for the frog), Kendrick and Ferrier (for birds and rabbits), Traube and Mengarini (for fishes). J. Ott [72] has recently published an experimental proof (in rabbits) for a thermic centre in the quadrigeminal region. Ziehen [73] showed that mechanical irritation of the tegmentum at the level of the

anterior quadrigemina causes movements of running; at the level of the posterior, continuous tonic convulsions of the extremities and the trunk,—epileptic attacks without involvement of the brain cortex.

It is noticeable that not one of these experimental physiologists makes any mention of the slightest diminution of hearing. Within the last decade a change has taken place in these observations, chiefly through the efforts of neuropathologists who had found that the quadrigemina, especially the posterior one, were included in the acoustic tract. Bechterew has made important investigations in this line [25] in guinea-pigs and white rats where the corpora quadrigemina are uncovered and accessible. Complete deafness was produced by the destruction of both posterior quadrigemina; in addition, a helplessness of motion, forced positions and movements, a loss of voice in deep destruction, in superficial only weakness and lack of timbre. On electrical stimulation, crying was produced (which has previously been observed by Goltz and Ferrier), lateral deviation of the eyes, turning and elevation of the opposed auricle. It must, however, be distinctly understood that these results cannot be directly applied to man. Large and important centres in animals change to unimportant reflex centres in more highly developed organisms. Some of the functions which in the lower mammals fall to the quadrigeminal bodies can and must belong to the cerebral sphere in man. In these experiments also the possibility of injury or irritation of neighboring deeper structures is very great.

4.—STATISTICAL CONTRIBUTION TO THE PATHOLOGY AND SYMPTOMATOLOGY OF TUMORS OF THE QUADRIGEMINAL REGION IN GENERAL (58 cases). (Abridged translation).

We have selected only those cases which were uncomplicated according to Nothnagel,[1] and in our collection have completed his classification up to March, 1896. We thus were able to collect fifty-eight cases (for list and table of symptoms see German Edition, vol. xxix., part 1, p. 47); forty-eight tumors of the quadrigeminal region with or

without involvement of pineal gland, and ten tumors of the pineal gland alone.

The anatomical examination gave:

1. Glio-sarcoma and sarcoma	17	cases.	29.3 %
2. Tubercle	17	"	29.3 %
3. Glioma	11	"	19 %
4. Carcinoma	3	"	5.2 %
5. Cystoid degeneration	3	"	5.2 %
6. Psammoma	1	"	1.7 %
7. Gumma	1	"	1.7 %
8. Lipoma (?)	1	"	1.7 %
9. Teratoma	1	"	1.7 %
10. Uncertain	3	"	5.2 %
	58		100 %

In regard to the frequency, the glio-sarcoma, including the sarcoma, and the tubercle are the most frequent (each 29.3 %). The gliomas occurred less frequently, and rarest were carcinoma, cystoid degeneration, psammoma, gumma, lipoma, and teratoma. This distribution agrees in general with that found by Starr[88] in a collection of six hundred tumors of the brain. A study of the age has elicited the following important diagnostic point: in the presence of symptoms of a lesion of the quadrigeminal region in a child below ten, we must at once suspect a tuberculous tumor; glioma, sarcoma, and glio-sarcoma belong to the exception. The most prominent and constant clinical symptoms of a disease of the corpora quadrigemina are, according to almost all authors, a combination of *ataxia* (atactic gait or intention tremor, Bruno, Gowers, Goldscheider) with *disturbance in the motility of the eye.* The former symptom occurred in 65.5 %, the latter in 75.9 % of our cases; the two combined, in slightly more than half the cases. Crossed hemiataxia with oculo motor paralysis was present in the case of Krafft-Ebing. The most striking symptom of the third-nerve paralysis was ptosis of the upper eyelid; it was permanent in twenty-one cases, transitory in four. In some cases disturbances of accommodation or slight nystagmus were noticed. The sixth nerve was rarely involved, though occasionally alone affected

(pressure on the especially exposed trunk, Gowers). In most cases the paralyses of the ocular muscles were unequally distributed as regards the muscles affected, a point upon which Nothnagel lays great stress in the differential diagnosis. Christ has emphasized the importance of finding bilateral trochlear nerve paralysis. Our cases show that mydriasis is a very rare appearance in tumors of the quadrigeminal region.

Motor disturbances were rather frequent, in 67.2 % of the cases, sensory disturbances were unusually rare, in 17.5 %.

Almost a *constant symptom* in tumors of this region are *changes in the optic nerve*, or its function. Blindness was present in seventeen out of the fifty-eight cases, and diminution in sight in twenty. Ophthalmoscopic changes were present in all of these cases except two, and in ten additional cases where sight was not materially affected. No change in the vision or in the appearance of the disc was noted in only four cases.

The *scanning* mode of speech was an interesting symptom in eighteen of the cases. The change of speech was a slowing, hesitancy, or an indistinctness or finally complete muteness (infracortical motor aphasia, fascicular anarthria) in two cases. When the right crus alone is affected, no dysarthria or anarthria occurs. Our cases seem to confirm the statement that dysarthria and "peduncular aphasia" also occur as symptoms of tumors of the left crural tegmentum, while they are absent in a similar lesion of the right crus.

(*To be continued.*)

I.—A CASE OF CHLOROMA OF BOTH TEMPORAL BONES, OF BOTH LATERAL SINUSES AND OF BOTH ORBITS, SIMULATING AN OTITIC PHLEBITIS OF THE CAVERNOUS SINUS.

II.—THE LITERATURE ON THE CHLOROMA OF THE TEMPORAL BONE AND OF THE EAR.

By Prof. O. KÖRNER, Rostock.

Translated by Dr. Arnold H. Knapp, New York.

THE following case is of great interest in several respects. The occurrence of a chloroma in the temporal bone is not mentioned in the literature of otology, and we have in this case proof that the symptom-complex due to an otitic phlebitis of the cavernous sinus may be caused by another intra-cranial affection.

H. P., six years old, of previous good health, became hard of hearing in August, 1895, and complained of headache, of increasing severity. Both eyeballs became prominent, especially the left one. On admission to the ear clinic the boy was well nourished, though very pale. A double exophthalmus, more marked on the left side, was very noticeable ; in addition, both abducent nerves were paralyzed, the left partially, the right completely. The cutaneous veins of the forehead were distended. Both temporal regions were swollen, but of normal resistance on palpation, and finger pressure left no depression. The ophthalmoscope showed marked bilateral choked disc. The pupils were of normal size and responded to light. Both drumheads were very protruding, of a pale grayish-yellow color ; the hammer was not visible. The left mastoid was tender on pressure, though otherwise normal like the right one. There was no swelling behind the mastoid. The veins of the neck showed no abnormality.

Paracentesis of both drumheads evacuated considerable pus without odor. The patient complained only of pain in the head ; his intelligence was good. The temperature varied between 37.5° and 38.3° ; the pulse was weak and irregular, 104–126 per minute.

At first the combinations of exophthalmus, choked disc, distension of the frontal veins, and sixth-nerve paralysis suggested the very probable diagnosis of a phlebitic thrombosis of both cavernous sinuses, caused by the double purulent otitis media and the probable mastoiditis in the left side. The swelling of both temporal regions could not be explained ; but owing to the symmetry and the lack of abnormal resistance or of œdema we regarded it as an abnormality of the skull, or an unusual development of the temporal muscles. It seemed most probable that the phlebitis was caused by the left ear, as that was the side most affected and the exophthalmus was most pronounced on that side. The bilateral changes in the eyes did not oppose this supposition, because transmission of inflammation from one side to the other is not infrequently observed, because of the close connection of the two cavernous sinuses through the circular sinus. The extension of the otitis media to the cavernous sinus could have occurred in various ways. The suppurative process in the middle ear may have involved the venous plexus, which intimately surrounds the carotid artery in its canal and is in direct communication with the cavernous sinus. Another possibility was the infection of the lateral sinus or one of the petrosal sinuses from a neighboring diseased mastoid cell, and extension of the phlebitis to the cavernous sinus. Tumors may press upon the cavernous sinuses and, independent of ear trouble, give rise to the above group of symptoms.

Notwithstanding the evacuation of pus from the tympanic cavities, the general condition remained the same during the next few days. On October 7th the boy complained of severe pain in the left ear, and the left mastoid was more tender. As the puncture opening of the drumhead had closed, paracentesis was again performed, with a fresh discharge of pus. The pain did

not diminish, and the temperature on the following day was 38.2° morning, 39.2° evening. We proceeded to open the left mastoid on the same day, realizing the danger of narcosis in the presence of increased intra-cranial pressure and a weak pulse. Chloroform was employed, as Macewen has pointed out the dangers of using ether under these conditions. The mastoid cells appeared normal. On opening into the middle cranial fossa the dural veins were found very congested. Before the antrum was reached, respiration ceased, and no pulse could be felt. After vigorous stimulation the patient revived somewhat, and the operation was brought to a close without exposure of the lateral sinus.

In the following five days the temperature was 38.6° to 39.5°, the pulse 140–150. During the next four weeks the temperature fell somewhat, the pulse became slower; the objective signs remained the same, the mind was clear, and the headache occasional. On November 13th, without a rise in temperature, the headache became more severe, the patient was restless, pulse 144, respiration 66. On the next day the back of the neck was decidedly rigid, and death occurred in a few hours.

The autopsy (Prof. Lubarsch) showed that there was no phlebitis in any sinus. Both lateral sinuses in their course along the temporal bones were completely occluded by greenish tumors originating in the sinus-wall. Similar tumors, starting from the base of the skull, had invaded the temporal bones. The sphenoid was also perforated with tumor masses. In the posterior parts of both orbits and in the temporal muscles tumors were found as large as a hazelnut. The microscopic examination confirmed the diagnosis of chloroma, previously made from the green color of the tumor.

Prof. Lubarsch will investigate the pathology of this case, so I shall not go into further particulars concerning the autopsy. I should, however, like to emphasize that the supposed symptoms of a phlebitis of the cavernous sinus—exophthalmus, sixth-nerve paralysis, choked disc, dilatation of the frontal veins—may be caused by retrobulbar tumors where the cavernous sinuses are unaffected. It is undecided whether the double purulent otitis was the result of the tumor formation or an accidental complication.

THE LITERATURE ON CHLOROMA OF THE TEMPORAL BONE AND OF THE EAR.

Since writing the preceding paper, I have looked over the entire literature on chloroma, and find that the temporal bone and the ear are involved in half of the cases of this remarkable and rare tumor; twenty cases of chloroma have been described, of which ten showed ear symptoms. In two of these cases, though ear symptoms were observed during life, the ears and the temporal bones were not examined clinically nor anatomically. In the remaining eight the tumor in the temporal bone was examined anatomically. Mine is the only case where a clinical examination of the ear was made.

Chloroma occurs always multiple, and generally in children or in young adults. Its origin is usually in the dura, in the wall of a sinus, in the pericranium, and in the cavities of the bonus of the skull, as well as in the orbits. It occurs very frequently bilaterally symmetrical. The temporal groove is a place of predilection, the chloroma then develops from the periosteum or in the substance of the muscle. If I had known this fact, I could have made the diagnosis from the marked swelling of both temporal regions. The frequent localization in the sinus and the orbits, associated with disease of the ear and the temporal bones, makes the knowledge of the tumor both important and interesting to the otologist, especially in a diagnostic line.

The reports of autopsies in reference to the involvement of the temporal bone and the ear, are, as far as they are obtainable, unfortunately very brief and incomplete. My abstracts are hardly shorter than the descriptions furnished by the authors.

REPORT OF THE LITERATURE.

1. DURAND FARDEL, *Bulletin de la société anatomique*, tome xi., 1835, p. 195. Tumor in the auditory canal and middle ear of both sides.

2. KING, *Monthly Journal*, August, 1853. Both temporal bones, outer surface of mastoid processes, base of the petrous bone (with erosion of the bone), lateral sinus. The bone of the middle ear is discolored and soft.

3. ARAN, *Archives générales de médicine*. October, 1854, p. 385. Among other symptoms: facial paralysis, subjective noises, and deafness. Tumor in

lateral sinus, inf. petrosal sinus, changes in the tympanum ("le tissu est gris et amincie") and other localizations.

4. BALFOUR, quoted by Aran. Deafness, vertigo, otorrhœa, tumor "sur le temporal droit."

5. DRESSLER, *Virchow's Archiv*, 1866, xxxv., p. 605. Swelling in the temporal fossa and on the mastoid. Tumors in the posterior part of the temporal bone and in the lateral sinus.

6. BEHRING and WICHERKIEWICZ. *Berliner klin. Wochenschrift*, 1892, No. 33. Deafness, subjective noises, swelling of the mastoid, facial paralysis. Tumors in the mastoid cells, in the contiguous muscles, and in the stylo-mastoid foramen.

7. GADE, *Nord. med. Archiv*, 1884, xvi., No. 9. Otalgia and otorrhœa. Tumors in the temporal part of the zygomatic process, in the middle cranial fossa, in the tympanum, and labyrinth of both sides.

8. HORING. *Contribution to our Knowledge of Chloroma*. Dissertation. Tübingen, 1891. Pain in the ear, swelling behind both ears, and deafness were the first symptoms. Clinically and at autopsy no further mention of the ears. Tumors of the lateral sinus producing a prominence externally on one side of the skull.

9. DOCK. *Amer. Journ. of the Med. Sciences*, Aug., 1893. Exophthalmus, swelling in both temporal regions, deafness, tumors in the walls of the sinus, in the orbits, and in both temporal fossæ. The ear was not examined.

10. KÖRNER. See above.

The rest of the literature (cases without involvement of the ears or the temporal bones) can be found in the articles of LANG, "Monographie du Chloroma," *Archives générales de médecine*, 1893, vol. ii., 1894, vol. i.; DOCK, see O. SCHMIDT, *Ein Fall von Chlorom*. Dissertation. Göttingen, 1895.

RESPIRATORY CLOSURE OF THE EXPOSED LATERAL SINUS AND AIR-EMBOLISM.

By Prof. O. KÖRNER, Rostock.

Translated by Dr. Arnold H. Knapp, New York.

RESPIRATORY movements of the lateral sinus, exposed in its temporal portion, have, as far as I know, only been observed by Jansen (*Archiv für Ohrenheilkunde*, vol. xxxvii., p. 21, Case 18), and by Schwartze (*Arch. f. Ohrenheilk.*, vol. x., p. 23, Case 2).

In Jansen's case the sinus was laid bare from the upper bend downwards for 5 *cm;* it was situated about $1\frac{3}{4}$ *cm* behind the auditory canal, and was covered with a thick, whitish-gray pseudo-membrane. The sinus did not feel hard, and sank repeatedly during respiration. Aspiration of the sinus was without result, though pus escaped through the puncture opening. The sinus was incised throughout its length; the walls were found thickened, and the lumen contained broken-down thrombolic clots of a greenish-yellow color. Above, there was a dark hemorrhagic mass, presumably the upper limit of the thrombus; below, the thrombus was not disturbed.

I have recently made the following similar observation:

Acute suppuration in both temporal bones after measles; severe pyæmia with multiple purulent metastases in the joints. Opening of both mastoid processes and three joint abscesses. Death six hours after the operation. No autopsy.

W. T., four and a half years old. Two weeks after measles developed an acute suppurative otitis in the right ear. One week later, rise of temperature, violent chills, painful erythemata over

the extremities. The left ear became affected, the temperature continued high; the right parotid, the left elbow, and the left foot were swollen. The mastoid processes had never shown any local signs and no tenderness. The lumen of the auditory canals was normal.

Operation.—The right mastoid process was opened. A large abscess cavity was evacuated, and the lateral sinus exposed for a distance of 2½ *cm.* The sinus wall was smooth, gray, and pulsated. The left mastoid was then opened and an abscess cavity found. The sinus appeared normal and was situated quite anterior and superficial, covered by bone of only 2 *mm* in thickness.

The sinus showed slight pulsation synchronous with the pulse. The patient coughed, and during the following deep inspiration we observed that the sinus collapsed, then dilated, and with the next inspiration again fell in. When the sinus was flat it appeared gray, but became blue when full. After a fit of coughing, the sinus filled so suddenly and tensely, that it seemed near to rupture; then the respiratory movements set in. When the sinus was collapsed, we could see between the sinus wall and the bone in either direction. To prevent further coughing the narcosis was stopped. The abscesses in the body were incised. Death followed six hours later. No autopsy.

An inspiratory closure of the sinus, laid bare and exposed to the atmospheric pressure, can only occur when the sinus is patent towards the heart, and closed off towards the brain; thus during inspiration the blood is aspirated toward the thorax, and cannot be replaced from the brain, or owing to cerebral anæmia the necessary amount of blood is not supplied quickly enough. The sudden beginning of the respiratory movements on a deep inspiration following coughing suggests the possibility that a thrombus situated proximally was dislodged by the coughing.

Whenever the suction power of the inspiration is so strong that the sinus collapses, air would be aspirated if the sinus were open, and death might follow through air-embolism.

Hitherto but one case of death after air-embolism of the lateral sinus has been reported (Kuhn, these ARCHIVES,

vol. xxvi., No. 1). Our case leads us to think that the danger of air-embolism in opening the lateral sinus is greater than is generally estimated.

Kuhn, in his article, has entered upon the various conditions and precautionary measures which must be observed in opening and evacuating a diseased lateral sinus to prevent air-embolism.

When the sinus shows respiratory movements, it should only be opened after the ligation of the jugular vein. We have seen that inspiratory suction may occur suddenly in a previously quiet sinus, and this is an additional plea for the ligation of the jugular vein before opening the sinus in all cases where the presence of a firm occlusion of the blood-channel in the direction of the heart is not known to exist.

A CASE OF OTITIC BRAIN-ABSCESS IN THE OCCIPITAL LOBE.

By Dr. J. MORF, of Winterthur, Switzerland.

Translated by Dr. Edwin M. Cox, New York.

SINCE the appearance of Körner's work, *The Otitic Diseases of the Brain, its Membranes and Blood-vessels*, the literature of otitic brain-abscess has increased so much, that it may be superfluous to make any further contribution to this subject. I think, however, that a recently treated case of otitic abscess in the right occipital lobe is of sufficient interest to be brought to general notice. Dr. Keller in Wald (Zürich) gave me on February 4, 1896, the following facts in the history of the patient.

J. J. K., engineer, fifty-six years old, up to the present well, became ill in consequence of exposure to cold during tunnel construction on November 20, 1895. He had chilly feelings, pain in the right ear, and occipital headache. He was treated by hot water syringing of the auditory canal, but without benefit, and since the condition became worse, he sought the advice of an aural surgeon in Zürich on Dec. 6th, who treated him three times in fourteen days with the idea that there was a small abscess in the right middle ear. There was no discharge of any kind. Mr. K., who was exceedingly sensitive, after two punctures of the drum membrane which did not bring any pus to light, feared further painful procedures and, seeking treatment by a specialist, consulted me. The pain in and about the ear was at times very severe and became less only temporarily with the use of migrænin, warm applications, and local blood-letting. Temperature, 37.6°–38° C., no chills.

I saw the patient in consultation with Dr. K., for the first time

on February 6, 1896, and made the following notes: Very stout man, with largely developed panniculus adiposus. Except for a somewhat fatty heart, internal organs healthy. Right external ear slightly prominent; over the mastoid moderate œdematous swelling. Fossa mastoidea somewhat tender. Posterior upper wall of the auditory canal markedly protruded downwards so that the drum membrane was not visible. Whispering audible to right ear at the ear; to left ear, the length of the room, about six metres. In the right ear, Politzer's procedure showed a sudden penetration of the air with slight rattling, and an improvement in hearing so that whispering was audible at 20 *cm.* Cranio-tympanic conduction lateralized to the right ear. Rinné negative on right side.

Nose and naso-pharynx showed no changes. About 2 *cm* behind the middle of the posterior border of the mastoid there was a small area of the skull tender on pressure which could be covered by the end of the thumb. Appetite fair. Patient complained of right occipital headache. Except for the sensitive spot already mentioned, the skull is nowhere tender on percussion. Temperature at this time 36° C, pulse 72–76, urine without sugar or albumin, no paresis anywhere, no paralysis, no vomiting, no dizziness, and no changes in the fundus of the eye. No otorrhœa. I made the diagnosis of a suppurative process in the middle-ear cavities, and ordered rest in bed, with ice applications. At the same time, I held out in prospect the opening of antrum, in case the inflammatory appearances did not soon disappear.

February 15th.—Over the right concha extending 2 or 3 *cm* beyond its line of insertion, and backwards over the mastoid process, there is a marked swelling, in which deep fluctuation can be made out. The concha itself was strongly pushed out. Temperature, pulse, and fundus of the eye, normal. Pain in the right temporal and occipital regions. It was immediately decided to open the mastoid antrum, and we proceeded under chloroform narcosis. After the usual preparations, a large curved incision was made, extending from a point 2 *cm* over the external ear and encircling it, and ending below the mastoid process. After division of the soft parts, which were about 4 *cm* thick, a subperiosteal abscess, containing about a tablespoonful of creamy, not foul-smelling pus, was evacuated. Since there was no discolored spot of bone and no fistula to be discovered, a typical chiselling of the mastoid was undertaken, and in order to get more room, the external half of the upper posterior wall of the

auditory meatus was also removed. The bone was ivory-like, and exceedingly compact. First, at a depth of about 2 *cm*, a cavity the size of a hemp-seed was opened through which a probe easily entered the tympanic cavity. This seemed to be the antrum diminished in size; the mucous membrane of this cavity was deep red and swollen; the cavity contained no fluid; no pus was to be seen anywhere. The operation wound was tamponed with iodoform gauze, and a few sutures used to diminish the size of the wound in the soft parts. Gauze dressing.

Beyond a slight elevation of temperature (38°) on the day after operation, and some swelling of the right upper lid, both of which conditions had disappeared on the following day, nothing alarming could be discovered. The patient's general condition became better, his appetite increased in the following days, the headache became less, and the swelling above and behind the ear disappeared. The sutured parts of the wound healed *per primam.*

On March 13th, Dr. K. wrote to me: "The general condition of the patient makes evident progress, he spends almost the entire day about the room, and is able to give much attention to visitors and to business. He still complains occasionally of severe pain in the head, only he now localizes it more in the region of the wound that is above and in front of the ear. No brain symptoms, no fever, appetite good, and bowels regular. Sleep sometimes disturbed. When the weather is good, the patient is able to go for short walks." On March 23d Dr. K. wrote: "To our astonishment, Mr. K. has, during the last two days, had again severe pain as formerly behind and above the ear, and also in the right frontal region. Temperature 37.3°, pulse 104. This morning he vomited twice."

On my visit, on March 24th, the patient again felt better. I made out a slight hyperæmia of the right optic papilla; the left was normal. No signs of paralysis, or of cortical irritation. Tendon reflexes not diminished. Temperature and pulse normal. The upper posterior wall of the auditory meatus no longer swollen, the drum membrane slightly scaly. Whispering is audible in both ears at six metres, and there is no rattling during the Politzer test. There is pain over the whole right side of the head, no hemiopia, sensorium unaffected, as was the case throughout, no dizziness, and no ataxia.

March 29th.—Well marked optic neuritis on the right side; less on the left. Otherwise condition the same.

April 26th.—Patient's condition has remained the same up to this time. Operation wound almost healed ; patient feels somewhat weak. Repeated, involuntary trembling movements occur in the left leg. Evening before this, patient when he wished to stand up, fell suddenly to the floor, and was unable to rise on account of imperfect control of the left arm and leg.

April 28th.—Patient lies on his back, respiration somewhat labored, left angle of the mouth hangs down somewhat ; the naso-labial field is obliterated, and the mouth is drawn to the right. The eyelids and eyes are moved normally, both pupils react properly, and the forehead can be furrowed even on the left side. The grip is decidedly weaker on the left than on the right. Patient localizes tactile sensations badly, and there is analgesia of the whole left side. Left leg almost entirely paralytic, speech undisturbed, sensorium normal, sight good, no hemiopia. Pulse 84, temperature 37.4°, lungs normal.

April 30th.—Left arm and leg and the lower branches of the facial nerve completely paralytic ; complete left hemianæsthesia. Speaks thickly, and swallows frequently ; the uvula diverges to the right. Respiration accelerated and labored. Temperature 37.2°. Pulse 88–90. Complains of occipital and frontal headache. Sees well, pupils not dilated. Suggested operation refused.

May 1st.—Condition the same, patient occasionally unconscious.

May 2d.—Speech stammering, respiration stertorous, great difficulty in swallowing. Pulse small, 140–144, temperature 38°. Patient is unconscious and does not control the sphincters.

May 4th.—Died with increasing difficulty in respiration.

Autopsy thirty-eight hours after death. Examination of head only. Bones thick and hard with spot of thinning. Vessels of the cerebral membranes tensely filled, pia mater very œdematous. Dura 2½ *cm* behind the angle of the sinus transversus thickened and dark reddish-brown over an area an inch in diameter, but without deposit of lymph ; pia at the same place only slightly darkened, and loosely adherent to the dura.

On removal, the right cerebral hemisphere was seen to be larger than the left, the end of the right occipital lobe overlapping the left about 2 *cm*, and the convolutions somewhat flattened. The circumscribed area of adhesion of the membranes extended as far as the third occipital convolution. Here the cortex appeared whitish and shining, but on the superior aspect it was

smooth, moist, and glistening. A horizontal section at the level of the dorsal surface of the *corpus callosum* showed normal brain substance. A second section at an angle of 40° or 45° to the first, carried downwards and outwards, opened two abscess-cavities. The smaller one lay 2 or 3 *mm* beneath the cortex, and its wall was partly formed of the partially softened cortical layer of the third, and the lower half of the second occipital convolution. This cavity was about 3 *cm* in diameter. In its inner wall was an opening through which a probe passing through a canal about 1 *cm* long entered the second and larger abscess. The smaller abscess was moderately full of greenish-brown pus without any offensive odor, the large cavity was filled with about two tablespoonfuls of pus similar in character. The long dial meter of the larger cavity was 4.8 *cm*, the transverse 3.2 *cm*, its posterior wall was 3 *cm* from the extremity of the occipital lobe, the anterior 2 *cm* from the *nucleus lentiformis*, and 1 to 1½ *cm* from the *thalamus opticus;* it lay above the posterior horn of the lateral ventricle. There was no distinct membrane lining the cavity, but its walls were ragged, with many small hemorrhages scattered through them, and with the neighboring brain substance softened to a limited extent. No signs of meningitis anywhere. The ventricles contained a practically normal amount of clear cerebrospinal fluid.

Two and a half *cm* behind the angle of the right sinus traversus, beneath the altered and thickened area of dura, lay a cavity in the bone of 2–3 square *cm* in size and ½ *cm* deep. This was filled with granulations, and communicated by means of a canal 3½ *cm* long with an isolated cell in the mastoid lying about ¾ *cm* behind and outside of the antrum. This cell, like the canal, was filled with granulations, contained no pus, and was imbedded in compact bone. It was a few millimetres behind the operation canal, with which no communication was discoverable. Except for the antrum and this cell, the mastoid contained no space holding air. All sinuses were uninflamed and patent, the drum-membrane and ossicles were normal. Some congestion of mucous membrane of middle ear was present. Labyrinth, aqueducts, and the seventh and eighth nerves were uninvolved.

We have to deal in this case with one of those rarer cases in which, in consequence of an acute otitis media, abscess of the brain results. According to Grunert (quoted by Körner,

l. c.), otitic brain-abscesses are brought about in 9 % by acute, and in 91 % by chronic middle-ear inflammation, and Jansen [2] found in the Berlin University Clinic among 2650 acute cases of middle-ear suppuration, only one complicated with brain-abscess, but among 2500 chronic cases of otorrhœa there were 6 cases of brain-abscess.

The course of the disease was from the beginning atypical, and did not present the usual picture of acute suppurative otitis media. In the chief spaces of the middle ear, the inflammatory appearances soon subsided, and never reached that degree of intensity present in the air spaces of the mastoid. Therefore no perforation of the drum-membrane occurred, there was no otorrhœa, and paracentesis neither disclosed the presence of pus nor allayed the pain. It has long been known, and Bezold shows in his "Diseases of the Mastoid Process" [3] and elsewhere, that inflammation in the tympanic cavity and of the drum-membrane often subsides, thus restoring normal or almost normal hearing, while the disease in the mastoid is steadily advancing. Thus it is of no consequence if this observation is made in a case of otitis with brain abscess. Such an occurrence is, however, not common, at least I find only 8 such cases mentioned in the literature of the subject, 1 each by Baginsky and Gluck, Schmiedt, Gruber (all quoted by Körner, *l. c.*), Hatsch, Shubert (quoted by Blau),[4] Schmiegelow,[5] and Mathewson.[6] Furthermore, Bezold (*l. c.*, p. 317), mentions a case of brain-abscess, not operated upon, in which three weeks before death "the acute middle-ear suppuration had ceased with closure of the drum-membrane and almost normal hearing."

How far the sclerosis of the mastoid process is responsible for the occurrence of intra-cranial suppuration I dare not decide, although the early presence of a tender spot behind the mastoid, the early occurrence of headache, and the late appearance of pus superficially point towards such responsibility. The views of various writers on this point vary. While some consider the ivoryizing and hypertrophy of the bone, a defence against the extension of the middle-ear suppuration into the cranium, others think that this increases the danger.

With reference to the location of the brain abscesses Körner (*l. c.*) says: "Those abscesses caused by disease of the temporal bone lie in neighboring parts of the brain, that is, in the temporal lobe, or in the corresponding half of the cerebellum, very rarely in the pons or in the peduncles of the cerebellum. Exceptions to this rule are rare." This state of affairs is explained by the fact that the primary suppuration in the middle ear reaches the cranial cavity either through natural passages (aqueducts, etc.) or through the bony wall of the cranium, and then penetrates the meninges already adherent to each other, or perforated by a fistula. Bergmann's teaching, that otitic brain-abscesses are always distant from the focus of disease, and separated from it by healthy brain substance, is contradicted and considered untenable by Körner and Jansen.

Anatomical relations considered, we ought to seek, as a rule, the point at which an abscess first breaks into the cranium in the anterior-upper (tegmen tympani) or in the posterior surface of the petrous portion of the temporal bone, that is, the posterior wall of the antrum, the saccus endolymphaticus, etc. Frequently the perforation is in the sinus transversus, especially in the descending portion, more rarely farther backwards. The last may be brought about, according to Hansberg[7], in acute suppuration, because in acute middle-ear suppuration the tissue immediately about the middle-ear spaces reaches a higher degree of hyperæmia than in chronic otitis, and thus is more suitable for the propagation of inflammatory processes to distant points.

According to Körner's rule, we should have expected in my case suppuration in the cerebellum, because the bone in the neighborhood of the sinuses involved in the disease was in the cerebellar fossa, and a glance at the anatomical relations seems to bear out this view. The following portions of the brain lie in relation to the petrous portion of the temporal bone: 1, the temporal lobe of the cerebrum, which covers the whole anterior and upper surfaces; 2, the cerebellum, which covers the posterior surface; 3, the pons, and the cerebellar peduncles adjacent to the internal auditory meatus. Since the temporal lobe overlaps posteriorly the

upper margin of the petrous portion, and with its posterior parts covers the tentorium, the occipital lobe comes nowhere in contact with that bone. Consequently middle-ear suppuration does not endanger to the same extent the occipital lobe as the temporal lobe and the cerebellum. Nevertheless the occipital lobe can be involved, and evidently in two ways, one directly from the temporal lobe, and another from disease of the bone or meninges covering it. As already noticed, such suppurative bone involvements lie usually in the posterior fossa near the sinus transversus. Disease of the venous channels, even phlebitis and thrombosis, rarely lead to suppuration in the brain (Körner, Jansen, *l. c.*). We should expect from the anatomical relations and structure of the sinus transversus, and the linea transversa of the occipital bone, that a focus of disease in the bone under the linea transversa would give rise to cerebellar abscess, that a similar focus above the line would cause abscess of the occipital lobe, and furthermore that any focus involving tissue on both sides of the line would endanger both portions of the cranial contents; this we find to be the case. Therefore, if in consequence of an extradural otitic suppuration an abscess in the occipital lobe occurs, we may conclude that the suppurative process has had its origin behind the angle of the sinus transversus and above the transverse line in the superior occipital fossa. This conclusion does not accord with the circumstances in my case, for in spite of the fact that the bone abscess lay under the transverse line, the brain abscesses were in the occipital lobe. I think that this apparently contradictory appearance must be explained by the fact that the thickened dura of the cerebellum afforded a defence against infection, while it did not provide sufficient resistance to the suppurative process inwards and upwards into the occipital lobe.

The views of writers on the occurrence of multiple otitic brain abscesses are diverse. Körner (*l.c.*) considers them rare, and warns us against confusing them with metastatic abscesses. Schwartze [9] and Blau (*l.c.*, p. 118) and others disagree with him. Treitel [10] calculates from Körner's and Schwartze's statistics that 16–17 % of all cases have multiple

abscesses. Abscesses in the occipital lobe of such character are rare, and Körner mentions one case of such character described by Sahli, in which unfortunately on account of advanced softening of the cerebral tissue the position of the abscesses could not be accurately determined. No description of the condition of the petrous portion of the temporal bone is given.

Concerning the age of the abscess, I am unable in my case to come to any definite conclusion, unless I know the time of beginning of the disease in the middle ear, the beginning of the optic neuritis, and the definite manifestation of the presence of abscess. The presence of pressure-pain does not decide this question. An abscess must reach a considerable size in order to cause an optic neuritis, and furthermore the disease in the bone would sufficiently explain the pressure-pain. The exacerbation of headache, the vomiting and the acceleration of the pulse occurring on the 21st, 22d, and 23d of March would perhaps give us a surer means of judging when the abscess began.

My observation appears to me important from a diagnostic point of view. In the latent stage, we had good reason for supposing the presence of disease in the cerebellum. The violent right-sided occipital headache, and the tender spot behind the mastoid pointed in that direction. Although cerebellar ataxia and cerebellar vertigo were absent, the reason for this view of the case was in no wise diminished, since these localizing sumptoms, in spite of the relative frequency of cerebellar abscesses, have been observed, according to Körner, only once clearly (Feinberg[11]). Rigidity in the muscles of the neck may also be absent. The later pain in the forehead was of no special significance, since localized headache does not always point towards disease at the site of localization. Furthermore, the occipital pain was continuously present, but since these symptoms are found in cases of extradural abscess, the diagnosis of cerebellar abscess was not permissible.

As soon as the abscess manifested itself, the appearance of things was changed. According to our present knowledge of focal symptoms we think that we are not likely to

make a mistake in a case of abscess in the temporal lobe. Notwithstanding that we know that the focal symptoms must be considered as the result of the influence of the abscess upon the internal capsule, and that an occipital abscess is capable of such action, nevertheless the absence of hemiopia directed our attention continually towards the temporal lobe.

Körner thinks that in some cases of abscess in the temporal lobe, if it lies far back and encroaches upon the occipital lobe, a subcortical lesion of the visual tract may lead to hemiopia. "The occurrence of hemiopia with other lesions of the internal capsule indicates that it has been brought about in the same manner as the latter." Why we missed entirely, in our case, any hemiopia, in spite of the fact that the whole occipital lobe was involved in the abscess, was perhaps because the foci of disease in the *centrum semiovale* can only cause symptoms of non-function when the whole involved tract is destroyed, and because in our case a small portion may have remained to afford conduction from periphery to centre or *vice versa* (Edinger [12]). It would be noteworthy, then, that the visual fibres passed the internal capsule uninjured, while still other symptoms of non-function indicated that the posterior part of that structure was involved. Be that as it may, we may have, as our case shows, a pretty extensive abscess of the occipital lobe without having any apparent involvement of the visual tract. Accordingly an accurate localizing diagnosis may be impossible.

The normal state of hearing on the left side spoke against the presence of an abscess in the temporal lobe. Not improbably, no defect in hearing would have been discovered even if looked for in the active stage of abscess formation, for very large abscesses have been found in the temporal lobe without any disturbance of hearing on the other side, and opposite-sided deafness has been only in a very few cases referred for its causation to abscess in that lobe.

Since no rupture of the abscess into the ventricle could be demonstrated, the cause of death in my case must be put

down to cerebral compression, and it is remarkable that during the whole course of the disease there was no slowing of the pulse.

Whether a second operative procedure would have been beneficial is not evident, for it is very questionable, whether, even with a very extensive exposure of the posterior fossa, the second deep-lying abscess would have been disclosed, and whether the narrow communication between the two portions of the abscess would have been large enough for drainage. The relation of the posterior horn of the lateral ventricle would not have permitted such deep incision as is possible in abscess of the temporal lobe.

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REPORT OF THE DIVISION FOR THE DISEASES OF THE EAR, NOSE, AND THROAT OF THE COPENHAGEN MILITARY HOSPITAL DURING THE YEARS 1888–93.

By Dr. AD. LEVY,

CHIEF OF CLINIC.

Translated and abridged by Dr. Arnold H. Knapp, New York.

THIS clinic was opened on April 10, 1888, and consists of an out-door patient department, and of several wards, with a total of forty-two beds. From 1888 to 1893, 3873 patients were treated; the following is a classified list of the diseases.

Diseases of the Ear.

THE EXTERNAL EAR AND THE AUDITORY CANAL:

Aspergillus	2
Cerumen obturans	342
Congelatio aurium	1
Corp. alien. meat. audit. ext.	14
Corp. alien. lobuli auris	2
Eczema auris	19
Furunculosis meat.	183
Herpes auris	1
Necrosis meat. audit. ext	1
Neuralgia	1
Otitis ext. ac.	43
Otitis ext. chr.	11
Polypi, exostosis et papulæ meat.	9
Ulcera meat.	4

The cases of impacted cerumen make 9.3 per cent. of all of the cases.

One of the cases of foreign body in the ear was somewhat severer than is usual: A six-year-old boy had introduced a piece of wood in his ear. After unsuccessful attempts at extraction, he came to the clinic and, on examination, the piece of wood was found to have been forced into the middle ear through the upper and anterior part of the drum-membrane. Under chloroform it was easily removed with a forceps, and measured $1\frac{1}{2}$ *cm* in length, and $\frac{1}{2}$ *cm* in breadth. The after-treatment consisted of the instillation of menthol-alcohol 1:100, and occlusion. The large perforation healed in one week, without suppuration and normal hearing.

Several flat papules were found in the meatus of a syphilitic patient, and disappeared after antisyphilitic treatment.

There were two cases of syphilitic ulcer; these were arched, one-quarter of an inch broad, covered by a dirty grayish membrane, and contracted the lumen of the canal; they disappeared with the antisyphilitic treatment. Syphilis seems to be frequent in the external ear and, according to the syphilographer, may appear here isolated.

Two cases of pedunculated exostoses, attached to the posterior wall, and nearly occluding completely the canal, were readily removed with a chisel. The anæsthesia employed was the instillation of a 30 per cent. cocaine solution in the auditory canal.

THE DRUM MEMBRANE.

Myringitis ac. et subac.	185
Myringitis chr.	22
Rupt. traumat. mbr. tymp.	34

Most of the cases of myringitis were caused by the cold water in bathing.

The ruptures of the drum membrane were generally caused indirectly by the report of a gun or cannon near-by, and were usually multiple and extensive. Contrary to usual custom, we have used concentrated alcohol in the treatment, and have had all perforations heal in less than eight days, and always without suppuration. The patients were kept in bed.

THE MIDDLE EAR.

Otitis med. ac. catarrh.	428
" subac. cat.	30
" ac. cat. in chr.	56
" chr. cat.	367
" ac. suppur.	585
" chr. suppur.	255
" ac. suppur. in chr.	78
Caries partis petrosæ.	14
Mastoiditis	10
Seq. otit. med. ac. cat.	6
" " " chr. suppur.	193

In the last four years we have discontinued the use of the Eustachian catheter in the treatment of catarrhal otitides, and employ a modified Siegel's speculum. This change has been more than satisfactory, and the results most encouraging. The introduction of the tubal catheter is generally difficult, often impossible, and always unpleasant to the patient. In employing Siegel's speculum to determine the motility of the drum membrane, or the presence of adhesions, etc., we noticed that almost always the hearing was improved for a longer or shorter length of time. This induced us to try the speculum in the catarrhal forms of middle-ear disease, and we have never seen any ill effect to follow its use.

The Siegel speculum which we use has two openings fitted with rubber tubes; one with a mouthpiece to aspirate the air, the other to be used as an auscultation tube. We may thus judge of the force required to rarefy the air in the auditory canal, observe directly the changes brought about in the position and relief of the drum membrane, and by means of the auscultation tube judge the patency of the Eustachian canal, the presence of fluids, etc. In short the action is the same as that of the Eustachian catheter, the after-effect more lasting, and the introduction painless.

The number of our cases of acute purulent otitis in the last three years is double that in the first three years, still we have not been forced to do a single mastoid operation during the last three years. In the treatment we lay great stress on rest in bed, and to this we think are chiefly due our good results.

Paracentesis is done as early as possible. Instillations of alcohol

are continued, and irrigations are only employed when the secretion has a bad odor. To show that the paracentesis shortens the course of the disease we had tabulated the cases with paracentesis and those with spontaneous perforations as follows :

1889.

27 Paracenteses, average length of disease ..... 18.5 days.
28 Spontaneous perforations, average length of disease . 39.3 "

1890.

6 Paracentesis, average length of disease ..... 21 days.
30 Spontaneous perforations, average length of disease .. 31 "

1893.

13 Paracenteses, average length of disease ..... 13.6 days.
26 Spontaneous perforations, average length of disease . 24.4 "

For the three years :

Paracenteses ..... 17.7 days.
Spontaneous perforations ..... 32.2 "

The three operations on the mastoid presented no noteworthy features.

A remarkable case of death after ear disease deserves to be reported. The patient had a purulent otitis on the right side with spontaneous perforation from which he recovered in one month. Two weeks later he returned with moderate pain and slight deafness in the same ear, and the signs of a catarrhal otitis. The pain disappeared in a day ; the patient then complained of pain in the abdomen, vomiting, and slight fever. One week later stupor, vertigo without headache, coma, and death. The autopsy revealed caries of the lower part of the petrous bone, and pus in the right lateral ventricle. The middle ear was normal except for the swelling of the mucous membrane.

THE INTERNAL EAR.

Hemorrhagia auris int. 3
Morbus Ménière. 2
Neuralgia auris 14
Surditas 1

Both cases of Ménière's disease recovered in two weeks with three-gram daily doses of quinine.

Most cases of neuralgia of the ear were due to carious teeth.

Diseases of the Nose.

Caries septi nasi	5
Eczema	20
Empyema antr. Highmor	7
Epistaxis chr.	35
Epistaxis ac.	25
Erysipelas	3
Fissura aperturæ nasi	4
Furunculosis	25
Polypus	32
Rhinitis chr. hypertr. et atroph	143
Rhinitis luetica	8
Sequ. contus. nasi	2
Periostitis ossis nasi	1
Tumor nasi	1
Ulcera scrophulosa nasi	5

In most of the cases of epistaxis the seat of hemorrhages was the usual one in the lower anterior part of the septum. In one case, however, the bleeding point was situated at the ant. tip of the middle turbinated and in another case there was an area of teleangiectasis just above the lower and ant. part of the septum.

Diseases of the Pharynx and Larynx.

Angina catarrh	25
" croup	6
" diphth	8
" phlegmon	9
" follicularis	18
Corpus alienum faucium	5
Globulus	5
Hypertr. tonsillaris	18
Pharyngitis ac.	6
" chr.	100
Laryngitis ac. et subac	234
" chr.	38
" tuberculosa	10
Tumores adenoideæ cavi naso-phar.	31
Corpus alienum laryngis	2
Tumor pharyngis	2
Polypus laryngis	5

Adenoid vegetations were removed with Gottstein's curette; no recurrence was observed.

The total number of operations is 487, including 204 paracenteses, 31 removals of adenoids, and 11 mastoidectomies. All patients recovered.

BEZOLD'S MASTOIDITIS WITH PYÆMIC SYMPTOMS.

By J. HEGETSCHWEILER, Zürich.[1]

(*With one Temperature Chart. Plate I, II.*)

Translated by J. M. Mills, M.D., New York.

A DISCUSSION of this subject is occasioned by a case of acute empyema of the mastoid portion of the temporal bone with pronounced pyæmic symptoms and proceeding, in the manner described by Bezold, to perforation of the inner wall of the mastoid process.

The history of the case is briefly as follows: the patient, sixty-four years old, previously in vigorous health, became ill on September 14th, of last year, complaining of chills and pain in the left ear and in the head. This was followed three days later by a sero-purulent discharge, that was at that time mixed with blood. The family physician advised syringing with boric acid solution and the frequent use of Valsalva's experiment. About the middle of October he had the first attack of chills, necessitating his going to bed (as up to this time he had been going about), and this also warned him of the seriousness of his illness. Two days after he had two more chills, and three days later, about October 20th, he suffered with considerable pain in the left shoulder and left lumbar region.

On November 4th, of last year, when I saw the patient for the first time, he presented the following appearance: he was of vigorous build, and his appearance was in accordance with his age. Intellect was clear. Moderate fever (37.5° to 38.9°). The left shoulder was swollen and sensitive to touch, and the patient complained of a dull pain in the depth of the left lumbar region. The internal organs appeared normal, and there was no swelling

[1] Read before Society of Swiss Physicians, Bâle, May, 1896.

of the spleen. The nasal and pharyngeal mucous membrane presented the appearance of a chronic catarrh.

The condition of the ear: On the left there was a profuse purulent otorrhea. After cleansing the meatus, the lower half of the tympanic membrane was found to be retracted; in the upper and posterior quadrant, there was a small perforation from which exuded in rapid succession, after each cleaning, a fresh drop of pus. Politzer produced a loud perforation sound. The mastoid externally is unchanged, but somewhat sensitive to touch, especially at the apex. There is neither swelling nor induration along the external jugular vein.

Diagnosis.—The initial chill, the fever curve with its regular evening elevation of temperature,[1] and the metastasis in the left shoulder and left lumbar region—for as such the dull pain in this region was to be considered;—all this in connection with the otitis media purulenta, could only be explained as a pyæmic infection of the entire system, originating in a suppurating focus in the temporal bone. Where this focus was located, whether in a sinus—I thought at first a thrombosis of the lateral sinus—or a vein of the bone (osteophlebitis), was not so easily determined. Against the sinus thrombosis was, above all, that notwithstanding the repeated and careful physical examination of the lungs, by myself and a colleague, who treated him, no morbid changes were found in the lungs, and the subjective symptoms of a pulmonary affection were also absent. Furthermore, the metastasis in the left shoulder and lumbar regions indicated more an osteophlebitic process. For, according to the general opinion, it is especially the small emboli from the veins of the bone that are able to pass through the pulmonary circulation and thus cause infarctus in the peripheral organs.

As a result of these reflections, I felt it my duty to advise the patient to have the mastoid process opened in order to cleanse and remove the source of infection which I suspected was present.

Unfortunately, notwithstanding the forcible representations of the dangers that could arise from a failure to operate, the patient refused.

The local process in the tympanic cavity was favorably influenced by the antiseptic treatment after enlarging the small perforation, and gradually the secretion decreased. On December 25th, the boric acid powder insufflated was found to be dry, so that the otorrhea could be considered at an end.

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[1] See chart.

In the meantime the general condition progressed less favorably. As can be seen from the fever chart, from the 2d to the 24th of November there existed a typical pyæmic fever with low, now and then normal, morning temperature and rising evening temperature. Since the paracentesis had permitted the free exit of the pus gathered in the tympanic cavity, the source of the above condition was to be found in the metastatic inflammation, *i. e.*, the phlegmon of the left shoulder and lumbar region in connection with the focus in the mastoid portion of the temporal bone. As, however, in the meantime, the pain and swelling of the shoulder disappeared spontaneously, this was left out of consideration. Therefore the other metastases were more noticeable. As was shown by the further progress, they were the cause of the high temperature in the month of November.

Three or four days after the last chill the pain reappeared, at the same time in the left shoulder and in the depth of the lumbar muscle. Although the patient at first complained only of a dull pain in the lumbar region, gradually the pain became intense, and finally the boring pain became almost unbearable.

At last there appeared on the surface of the skin a swelling about the size of the palm of the hand, and fluctuation could be detected in the depth. I therefore decided, with the consent of the family physician, to make an opening into the deeply situated abscess as soon as possible, in order to prevent its eventual perforation into the pelvic cavity. The place of distinct fluctuation determined the line of incision ; about three fingers' width to the left of the spinal column and parallel with it, from the crest of the ilium, extending about 10 centimetres upwards. After separating the skin and the thick fat layer, the fascia lumbodorsalis appeared. This was opened 2 *cm* in width, and the wound dilated with the dressing forceps, whereby a creamy pus was evacuated. Then the fascia was divided in the entire extent of the outer wound, with the probe-pointed bistoury and the wound opening tamponed with iodoform gauze.

As can be seen from the temperature curve, the patient, in the following eight days, was entirely free from fever, which offered additional proof that the high temperature from November 2d to 24th was caused by the metastatic abscess. During the after-treatment I was enabled to convince myself that the pus had already begun to penetrate into the pelvis, so I endeavored to prevent further progress in this direction by carefully tamponing the wound, which was already distended downward.

In the beginning of December the appearance of the disease changed. After the patient had complained of heat and pain in the left heel and sole of the foot, on December 2d an œdematous swelling appeared on the left leg, especially around the ankle, and in the depth of the calf a sensitive cord-like resistance could be felt. Then there was a simultaneous rise of temperature. The diagnosis of inflammatory thrombosis of the femoral vein was evident, but the manner in which it originated was not, as from the existing conditions it could as well have originated in a phlebitic thrombosis starting from a lumbar or pelvic abscess, as from a new embolus of the original focus in the temporal bone. The former supposition was suggested by the appearance of those typical contractions of the thigh characteristic of psoas abscess.

This new complication weakened the patient considerably; he became delirious, and we were compelled to give an unfavorable prognosis, even as regards life. But the strong constitution of the patient, aided by the tonic treatment, enabled him to withstand also these complications, and the case seemed to progress favorably.

But on January 6th of last year, the second day after the recurrence of the otorrhœa, a dense infiltration, about the size of a nut, appeared between the mastoid process and the ascending arch of the lower jaw, *i.e.*, in the parotid region. As this gradually increased, in the next few days, both in the width and in thickness, it interfered with the opening of the mouth.

The expectant treatment to which I was compelled to resort on account of the excessive fear of an operation, had at least this advantage that I had an opportunity to observe and carefully follow the further clinical course. As the infiltration extended farther downward and backward, it reached at last, in one direction, the thyroid cartilage, and in the other the median line of the neck. Above, however, it met with a barrier in the muscles inserted in the mastoid portion of the temporal bone.

As is evident, we have here the clinical picture of what was described at first by Bezold as empyema of the mastoid portion of the temporal bone, with extension of the inflammation under the mastoid process, and has since then been known in the literature by his name. Bezold,[1] however, states that the purulent focus, situated under a threefold muscular layer, could with

[1] See Schwartze's *Handbuch*, vol ii., p. 320; and *Deutsche mediz. Wochenschr.*, 1881, p. 383.

difficulty penetrate upwards, so that the outer surface of the mastoid portion of the temporal bone, as a rule, remains free. I, on the contrary, was surprised, on January 26th, to see the outer covering of the mastoid, previously closely adherent to the bone, now appearing as a distinctly fluctuating swelling, and which finally extended above the upper attachment of the muscles to the squamous portion of the temporal bone.

On January 26th, this abscess perforated into the auditory meatus. As a similar perforation of the pus collected under the mastoid process was not to be expected, I at last obtained permission to open it. This was done on January 28th, by making a large curved incision around the angle of the jaw. The posterior part of the curved incision was carried quite high, and then with the probe-pointed knife I partly divided the insertion of the sterno-cleido muscle on the mastoid process, in order to provide free drainage below for the pus, as far as this was possible, without opening the mastoid process, which I was not permitted to do. After this procedure the discharge ceased within 8 days without further treatment, and since then the auditory meatus has remained dry. L: whisper in 20 *cm*; Rinné + 15 sec.

The deep wound in the neck healed well, with the exception of a small fistula that continued to secrete. Also the wound in the lumbar region closed, leaving only a narrow but secreting sinues.

It may seem hardly justifiable to appear before you with a single case of pyæmia after an acute otitis media, since Hessler, only a short time ago, compiled and described, in his book, 398 similar cases of otogenic pyæmia. Still I believe that the complete picture of pyæmic disease has seldom offered such a variety of symptoms as in this case.

Aside from the initial chill and the pronounced pyæmic fever curve, the following conditions merit consideration:

1. The metastases. They occur in the majority of cases of otitic pyæmia (according to Hessler in 64.3 per cent.), and can therefore be considered as pathognomonic symptoms. In our case, that which first deserves attention is the favorable course of the metastases in the joint in contrast to the insidious and protracted progress of the metastases in the lumbar muscles. The bacteriological examination presented the following:

The direct examination of the pus from the ear on a cover-glass preparation showed numerous diplococci with distinct capsules, which were colored according to Gram.

The pus from the lumbar abscess was obtained right after the opening under antiseptic precautions. It was caught up with a sterilized pipette, and inoculated upon gelatin, which was then poured into Petri-dishes.

The colonies presented a pure culture of the streptococcus. As these appeared only in short, straight, or slightly curved rows and in the diplo arrangement, the supposition that these are the same organisms as were found in the ear discharge is well founded, especially as the differential diagnosis between the diplococcus and streptococcus is, at present, very uncertain.

2. The thrombosis of the left leg. This was most likely, as already stated, due to phlebitis of the vein of the cellular tissue of the pelvis transmitted to the femoral vein. With its development, in the beginning of December, a new fever focus was established, and with its elimination the vitality of the organism threatened to become exhausted. As is apparent from the fever chart, the curve rose again, beginning with 39.7° to the former height, and then, with regular drops, gradually approached the normal on December 23d, when the evening temperature was 36.4°, its lowest point.

3. Bezold's mastoiditis. This confirmed our early supposition of an osteo-phlebitic process in the mastoid cells and demonstrated the necessity of an operation. Its development was aided by the presence of one or more of the terminal cells which frequently occur at the age of our patient. These, by hastening the perforation downward, rendered a kind of spontaneous healing possible and thereby saved the patient, so fearful of an operation, from the danger of a penetration into the cranial cavity.

The fever, varying between 36.8° and 38.7°, and mostly intermittent, was most likely caused by the extension of the suppurative process in the soft tissues on the outer surface of the mastoid, following the perforation in the beginning of January. Of interest was the rapid spontaneous cessation of the otorrhœa with closure of the perforation after the pus,

collected here, had obtained a free outlet by the extensive incision and detachment of the sterno-cleido muscle.

Also from a diagnostic standpoint the case, in my estimation, is of a certain importance, inasmuch as it confirms the statement of Köner in his monograph on *The Otitic Diseases of the Brain*,[1] that "when in conjunction with an acute otitis media, and notwithstanding a free discharge, high fever, with or without a chill, occurs, then is the supposition justified that it is a pyæmia from an osteophlebitis. And if in addition there are metastases in the joints, bursæ, or muscles, the diagnosis is certain."

And finally, it offers an important indication for the treatment, inasmuch as it teaches that *when chills and fever are associated with an acute otitis media, the opening of the mastoid process is indicated when it is unaffected externally, or is not sensitive to touch.* If in addition, as in the majority of cases, metastases develop, then the failure to operate is a professional error only excusable when the patient's consent cannot be obtained.

I have been positively convinced that our patient would have been completely cured, *i. e.*, without a fistula in the mastoid process, and in a much shorter time, if the operative procedure had been undertaken immediately after the first chill.

In view of this case it is inconceivable that Michael would only operate "when such symptoms appear which point to the presence of an intense inflammation of the bone, or to the transmission of the process to the meninges, the brain, or the sinus, or to the presence of pyæmia"!

[1] See p. 81.

REPORT OF THE THIRTIETH ANNUAL MEETING OF THE AMERICAN OTOLOGICAL SOCIETY, HELD AT WASHINGTON, MAY 4, 1897.

By Dr. ARNOLD H. KNAPP, New York.

The following papers were read:

1. **Goutiness in its Relations to Diseases of the Ear,** by Dr. A. H. Buck, of New York.

After a review of the scanty literature on this subject, the author spoke of the following affections of the ear due to the gouty diathesis: eczema of the auricle and of the external auditory canal, deposits on the drumhead, changes in the mucous membrane of the middle ear. The eczema appears in circumscribed patches. Rarely the adjacent bone becomes involved; presumably a process similar to the one which Garrod has observed in the neighborhood of joints. Local applications are of but little value; the general gouty tendency should be treated.

Discussed by Drs. Tansley and Dench.

2. **The Differential Diagnosis between Diseases of the Sound-Conducting and Sound-Perceiving Apparatus,** by Dr. E. B. Dench, of New York.

The author described the well-known quantitative and qualitative tests in the functional examination of the ear, and passed in review the methods usually employed in locating the seat of the lesion.

Discussion.—Dr. Theobald remarked that occasionally Weber's test gave a different result according as the tuning-fork was placed on the vertex or on the forehead. Dr. Alderton for this reason prefers to place the fork against the incisor teeth. Dr. Blake said that the perception of a tuning-fork varies with the thickness of the skull, and drew attention to the fact that notes produced by Galton's whistle of more than 12,000 vibrations per second

were not reliable. Dr. DENCH in conclusion said that he prefers the Schwabach test to the Weber, and employs the former to verify the results of the latter.

3. **Ear Complications of Influenza,** by Dr. W. P. EAGLETON, of Newark, N. J.

The author emphasized the frequency of ear affections in influenza and the presence of the Pfeiffer bacillus in the discharge. The symptoms are more severe than in the uncomplicated otitides, and the disease more rapid. Hence in otitis media paracentesis should be done earlier, and in mastoid involvement operative measures should soon be resorted to, as the tendency to destruction of bone is very much greater.

4. **What Symptoms should we Consider most Important as to the Advisability of an Operation in Mastoid Disease?** by Dr. GORHAM BACON, of New York.

In mastoid disease there is always a rise of temperature, which is in children unproportionately greater. The author considers tenderness over mastoid with fever, after the otitis has lasted one week to ten days, suspicious of mastoid involvement. Pressure should always be made over both mastoids in testing for tenderness. Redness, œdema, and tenderness can occur in furuncle. Bulging of Shrapnell's membrane and drooping of the posterior wall of ear canal are pathognomonic signs. Treatment should be early paracentesis, leeches, then ice-coil on mastoid process, and frequent douching of ear. Politzer may be used with caution when the disease is abating and there is a wide perforation. A continuance of the above symptoms makes the operative opening of the mastoid cells necessary. When the temperature has been high for some time it does not always fall immediately after operation.

Discussed by Drs. JOHNSON, DENCH, TANSLEY, and BUCK.

5. **Thrombosis of Lateral Sinus with Perisinuous Abscess; Death; Autopsy.** By Dr. ALDERTON, of Brooklyn.

This is the report of a case with the typical signs of a thrombosis and a thickened jugular vein. During the operation the sinus was exposed; a large perisinuous abscess evacuated before the antrum had been reached. The operation was concluded, but the symptoms persisted, and two days later the thrombosed lateral sinus was incised and cleaned out, though the operation was again not extended to the antrum. The patient died two days later of metastatic pneumonia. At the autopsy, the brain

was found normal, the tegmen antri necrosed, and the path of infection extending between dura and bone to the sinus. To the author this case was of great value, because it shows the importance of always exploring the antrum and the advisability of ligating the internal jugular in thrombosis of the lateral sinus.

Discussion.—Dr. DENCH thought that the internal jugular vein should only be ligated in cases where it was visibly affected. In conclusion, Dr. ALDERTON wished to extend the indications for ligating the internal jugular to cases where the wall of the thrombosed sinus was diseased.

6. **A Case of Extreme Deafness in which Great Improvement of Hearing Followed the Use of Pilocarpine,** by Dr. GORHAM BACON of New York.

A man, thirty-three years old, had an otorrhœa after scarlet fever in youth. After an attack of typhoid fever the hearing was greatly reduced, so that he had to use an ear-trumpet, and the bone-conduction was almost absent. The patient was kept in bed and given pilocarpine hypodermically. Improvement was first noticed after two months of this treatment. He then could hear conversation. Both membranæ tympani and ossicles were removed. Hearing became still better and was permanent. The best results of the pilocarpine treatment were seen in cases due to syphilis.

Discussion.—Drs. DENCH and TANSLEY.

7. **Deviated Nasal Septa in Ear Diseases, with a New Operation for their Correction,** by Dr. J. OSCROFT TANSLEY of New York.

This method of operating is performed in two sittings under cocaine anæsthesia. An incision is made along the concavity of the deflection from behind forward. The mucous membrane is dissected from this incision in an upward and downward direction. Pressure is then carefully exerted on the convex surface of the deflection from above down and in, and from below up and in, manipulating the obtuse angle surface to a vertical septum with a horizontal spur, formed by the approximation of the two thicknesses of the septum. This projection is then removed at the second sitting.

8. **Adhesions Connecting the Eustachian Tube to the Pharyngeal Wall above,** by Dr. R. C. MYLES of New York.

The author reported two cases where he had found changes in the lateral and superior pharyngeal wall. The fossa of Rosen-

müller was converted into a number of cavities by adhesions extending from the Eustachian tube to the basilar process. There were some ear symptoms present and others referable to congestion of the base of the brain. The adhesions were torn with the finger under cocaine with the subsequent relief of the symptoms.

Dr. NICHOLS of New York demonstrated a self-retaining operating electric speculum for the ear.

In the afternoon of the same day a general meeting of the Congress was held under the direction of this Society. Dr. CLARENCE J. BLAKE of Boston, delivered a most interesting and scholarly address on **Otology in its Relations to General Medicine.** After describing the foundation and the development of otology as a special branch of medicine, the speaker drew attention to the importance of a proper care of the nose and pharynx during the acute exanthemata. School children should be examined more carefully for deafness, and when this defect exists compensatory advantages should be afforded. Systematic examination of the ears of the children in deaf-mute institutions would show a much greater degree of partial hearing than was formerly supposed, and suggest methods of training in particular directions with greater prospects of general improvement. Owing to the complicated anatomy of the temporal bone and its intricate relations, surgery of the ear belongs with right to the aural specialist. The close relation of otology to general medicine is especially marked in that group of affections commonly called the chronic catarrhal inflammation of the middle ear. It is due mainly to otology that that peculiar symptom, vertigo, has received a better explanation. We now differentiate between *aural* and *auditory* vertigo. The " fatigue of deafness " is a condition from which many deaf people suffer, through the increased demands made upon their faculties to keep in communication with the outside world ; this condition should never be lost sight of by the otologist and the general practitioner. The speaker in closing urged the establishment of obligatory courses in otology at our medical schools, and more opportunities for the graduate student to continue the study of the ear.

REPORT ON THE PROGRESS OF OTOLOGY IN THE FIRST QUARTER OF THE YEAR 1897.

By Dr. ARTHUR HARTMANN.

Translated by Dr. CHARLES ZIMMERMANN, Milwaukee, Wis.

ANATOMY OF THE EAR.

1. GRUBER, Jos., Prof. Remarks on the canalis caroticus, with reference to practical otology. *Monatsschr. f. Ohrenheilk.*, No. 1, 1897.

1. The curvature of the canalis caroticus of the petrous bone varies even in children in regard to the radius and the lumen at different points, but it is more marked in adults. In consequence of a greater bent, the portion of the osseous canal which projects into the tympanic cavity becomes more prominent, and makes the tympanic cavity more narrow. In very marked cases the canalis caroticus may almost cover the whole promontorium. Retracted drumheads may become adherent to it in such cases, and in paracentesis it might be injured. Such a condition may also cause pulsating and other subjective noises. KILLIAN.

PHYSIOLOGY OF THE EAR.

2. GELLÉ. Preservation of hearing in anchylosis of the stapes. *Arch. internat. de laryng., d'otol.*, x., 1.

3. EWALD, R. Contribution to the physiology of the labyrinth. Fifth communication: The relation of the labyrinthine tonus to rigor mortis and on the order in which the various muscles become subject to rigor mortis according to Nysten *Pflueger's Archiv*, vol. lxiii., p. 521.

4. BEZOLD, FR., Prof. The place of consonants in the scale. These ARCHIVES, Germ. Edition, vol. xxx., p. 114.

5. STEIN, L. WILLIAM. Demonstration of an apparatus to produce a continuous and uniform alteration of pitch of the tones. (With an appendix : A new air-pump for acoustic experiments.) *Verhandl. der Physikal. Gesellschaft.*, Berlin, sixteenth year, No. 4, p. 42.

2. GELLÉ thinks the theory of v. Helmholtz erroneous, that the mobility of the plate of the stapes is the chief condition under which oscillations of sound may be transmitted from the chain of the ossicles to the labyrinth. He reasons thus : As in some experiments a thin plate, which is fixated with its whole periphery, transmits oscillations of sound, and as in anchylosis of the stapes no complete deafness ensues, the mobility is not necessary for the conduction of sound. It is rather a protective arrangement enabling one to fixate the plate voluntarily through the two intrinsic muscles in loud noises and to weaken the hearing. (Valsalva's experiment, centripetal pressions, swallowing while the nose is closed.) The transmittance of sound occurs only by molecular vibrations, for which the chief requirement is that the plate be very thin.

From this late discovery G. concludes that complete deafness is not simply due to anchylosis of the stapes. Therefore its detachment can be of no avail. ZIMMERMANN.

3. EWALD found the labyrinth to exert an influence upon rigor mortis by observing a different condition of the muscles, after the death of the animal, according to their nervous communications with the labyrinth. In some of his pigeons and rabbits rigor mortis set in earlier after removal of the labyrinth. In the great majority of cases the phenomenon could *not* be ascertained in pigeons. In the rabbit even a post mortal mechanical irritation of the labyrinth (destruction) or a post mortal electric irritation influences the rigor.

After removal of the labyrinth motor disturbances act on the muscles of the skeleton in the following succession : The muscles of the eye, of mastication, of the nape of the neck, larynx, arms, chest, abdomen, legs. This corresponds with Nysten's order of occurrence of rigor mortis in the various muscles.

Willgerodt, on the suggestion of Ewald, found that the order of Nysten commences with the ocular muscles. Ewald reports in this article the methods of W. Ewald attributes the cause of

Nysten's order and the retarded onset of rigor mortis after resection of nerves to the more or less developed labyrinthine tonus.

ASHER.

5. STEIN demonstrates an apparatus the working of which is the following: A tone can be changed in pitch, while sounding, by continuous and voluntary retardation of its vibrations. The velocity of the alteration may be uniform and the pitch arrived at may be read at any time. The sonorous instrument is a bottle, the air of which is set in vibration. It is tuned for a certain note by pouring in mercury, and it communicates with a peculiarly shaped vessel, the "variator." The level of both vessels is simultaneously altered by a cylinder with a piston. The pitch depends upon the level. The peculiar form of the variator is due to the fact that the velocity of the change of level in the bottle must gradually decrease, to produce a uniform velocity of the change of tone. The beats (Schwebungen) caused by the co-existence of the tone of the apparatus and the tone of another instrument may serve to determine the number of vibrations of the latter, as the moment in which the beats cease may be easily ascertained.

MISCELLANEOUS.

a. STATISTICS AND REPORTS.

6. BARNICK, O. Report of Prof. Habermann's clinic for ear, nose, and throat patients at the University of Graz, from October 1, 1894, to December 31, 1895. *Arch. f. Ohrenheilk.*, vol. xlii., p. 96.

7. STETTER, Prof. Observations on diseases of the ear, nose, and throat. VIII. Jahresbericht. *Monatsschr. f. Ohrenheilk.*, No. 3, 1897.

8. ALT, FERDINAND, Dr. Casuistics. *Monatsschrift für Ohrenheilk.*, No. 3, 1897.

6. Aside from the usual statistics, 2 cases of necrosis of the auricle, and a case of pyæmia due to phlebitis of the sinus after acute purulent otitis media are reported. Of 20 radical operations, 10 were performed for cholesteatoma, 10 for caries *without* cholesteatoma. Habermann also aims at a retroauricular closure of wound.

BLOCH.

7. STETTER mentions a case, in which unskilled manipulations in the ear canal for removal of inspissated cerumen had caused otitis externa with abscess on the squama of the temporal bone.

S. is rather conservative in regard to radical operations after he saw a number of cases, operated on by others, not recover. He makes a mistake, however, if he considers Wilde's incision sufficient in cases, in which the opening of the mastoid process is indicated, if there is no fistula or apparent affection of the bone.

KILLIAN.

8. Report of a case of probably alcoholic neuritis of the auditory nerve as partial symptom of alcoholic polyneuritis with affection of the optic nerve. A case of sclerosis of the middle ear, in which the hearing was improved, and unbearable subjective sufferings relieved by artificial perforation of *Mt.* The perforation remained patent, after injections of liquid vaseline *per tubam*, had been made for some time, which had produced a slight otorrhœa. Finally ALT speaks on the closure of old perforations by application of liquid trichloracetic acid on the margin of the perforation, every fourth day, by means of a probe. A. thus obtained complete closure after 3 to 15 cauterizations, and sometimes improvement of hearing. Perforations of Shrapnell's membrane at the posterior superior quadrant and very large perforations involving almost the whole *Mt* are not fit for this mode of treatment. KILLIAN.

b. GENERAL PATHOLOGY OF THE EAR.

9. MINOR, JAMES L. Complication of mumps with aural diseases, with report of eight cases. *New York Med. Jour.*, March 27, 1897.

10. CROCKETT, E. A. Acute syphilitic affection of the ear. *Boston Med. and Surg. Jour.*, Feb. 11, 1897.

MINOR has collected the notes of eight cases, six of which were seen by himself and two more unreported cases of another physician. He finds that the left ear was affected in five, the right in one, and both ears in two cases. In the eight cases, both parotid glands were involved. In no case was the testicle affected. From a study of these eight cases, it will be seen that the trouble began and ended in the middle ear, in three cases; in one case, the inflammation began in the middle ear and extended to the inner ear; in three cases, the seat of the disease was in the labyrinth, the cochlea alone being involved; while in one case, the writer thought the disease had its origin in the semicircular canals, and subsequently extended to the middle ear and cochlea. Minor concludes by saying that, "if these cases were promptly and in-

telligently treated, instead of being consigned at once to the category of incurable affections, a large proportion of them would doubtless recover their hearing." GORHAM BACON.

CROCKETT believes that syphilitic affections of the ear are much more frequent than is generally supposed. He reports three cases from among fifteen or twenty observed.

The first case was that of a man, forty years of age, with no previous ear trouble, but who had syphilis about six months previously. He never received any treatment. Three weeks before Crockett saw him, he began to have ringing in the ears, and deafness which became very complete; also some vertigo, so that his gait was unsteady in walking.

Watch: right, $\frac{c}{60} = o —$; left, $\frac{c}{60} = o —$

Voice: right, $\frac{1}{65} —$; left, $\frac{1}{45} —$.

Tuning-fork, C, 512 v. s.: right, $\frac{8''}{0}$ a. c. b. c.; left, $\frac{12''}{0}$ a. c. b. c.

Upper limit: right, Galton, 2.9; left, Galton. 2.6.

Lower limit: 64 v. s.; heard with both ears.

The tinnitus and vertigo were at this time very marked.

The second case was that of a man, twenty-eight years of age, who had syphilis three years before. The deafness came on suddenly and was extreme, with severe vertigo and vomiting. Tinnitus like a sea-shell in his ears. He staggered to the left in walking. The disease seemed to be limited to the auditory nerve.

The third case was that of a man, thirty-five years old, who had syphilis six months previously and who had been under careful treatment. Deafness came on suddenly, accompanied by violent vertigo and tinnitus, until in the course of two or three days he became very deaf and could not attend to his business. Drumheads clear and in normal position, and tuning-fork and other tests showed that the seat of the trouble was in the auditory nerve.

These cases all had a marked similarity of symptoms—very sudden and severe deafness, more or less severe vertigo, and violent tinnitus occurring in persons previously free from ear trouble. In all the cases, the watch and voice deafness was very marked, and a tuning-fork of the middle register was wholly lost to bone-conduction but remained fair for air-conduction. At the same time, the upper register, as shown on the Galton whistle, was more or less diminished, and the lower limit usually remained unaltered. This hearing test, according to Crockett, is quite characteristic of syphilis and he says, "that the clinical evidence would seem to be in favor of an effusion into the labyrinth," as a cause of this par-

ticular group of symptoms. In the majority of cases observed by the writer, a diagnosis of cranial trouble had been made, and consequently an unfavorable prognosis was given. This complication of syphilis frequently comes on in cases that have received careful and thorough treatment. This was especially so in the third case. Under these circumstances, the subcutaneous administration of pilocarpine up to its full physiological limit will be of great service. Great improvement in hearing and diminution of vertigo follows the administration of this drug in acute cases.

The writer concludes by saying that pilocarpine is an absolute specific in all acute syphilitic cases presenting the previously described symptoms ; that where the deafness and vertigo have persisted for over a month, the prognosis is very doubtful ; that it is of great value in cases where iodide and mercury are of little avail ; but that it has no permanent value, and should be used in conjunction with other anti-syphilitic treatment.

GORHAM BACON.

c. GENERAL THERAPEUTICS.

11. FORNS. On the puncture of the round window with following aspiration as a mode of treating affections of the labyrinth. *Ann. des mal. de l'or., du lar.*, etc., March, 1897.

12. HORNE, JOBSON, and YEARSLEY, MACLEOD. Eucaine as a local anæsthetic in the surgery of the throat, nose, and ear. *British Med. Journ.*, Jan. 16, 1897.

11. FORNS proves that the method published by Botey (these ARCHIVES, Germ. Ed., xxx., 2) is based on erroneous anatomical conceptions, aside from its clinical admissibility. F. shows on specimens and pictures that certainly the vestibular ends of the membranous cochlear whorls are destroyed and peri- and endo-lymph evacuated, if, according to Botey, the needle is pushed in upwards and forwards. It must be introduced forwards and then downwards, if only perilymph is looked for. This requires an especially fine canula with a director that has two bents, one for each ear. This operation can, according to F., hardly be executed, the technique being too difficult, as a deviation of a few tenths of millimetres has to be avoided, which can scarcely be controlled. ZIMMERMANN.

12. HORNE and YEARSLEY, after a certain amount of experience of eucaine, find that eight per cent. is the most reliable strength for operative measures. Although taking longer than cocaine to

produce anæsthesia (five to ten minutes,) they think its action is equal to it, and has the advantage of producing little if any toxic or after-effects. The anæsthesia produced lasts from fifteen to twenty minutes. One great drawback of its use in nasal surgery appears to be its inability to produce thorough contraction of the turbinal bodies. It will be of great use in children if on thorough examination it fulfils expectations.

ARTHUR CHEATLE.

d. DEAF-MUTISM.

13. KREBS, G. Aural and nasal examinations in the deaf and dumb asylum of Hildesheim. *Arch. f. Ohrenheilk.*, vol. xlii., p. 119.

13. One third almost of the 93 inmates suffers from considerable affections of the nose and pharynx, chiefly hyperplasia of the lymphatic ring, recognized by the teachers through *rhinolalia clausa*. In older pupils the high palate and the abnormal position of the teeth were the unmistakable signs of the former. Other authors found even a higher percentage of adenoid vegetations, up to 60 % and 70 %. K., expected some result from Urbantschitsch's hearing exercises in 5 cases. Finally he postulates the appointment of a physician with sufficient otological and rhinological knowledge for each deaf and dumb institute.

BLOCH.

INSTRUMENTS AND METHODS OF EXAMINATION.

14. SELIGMANN, H. D., Frankfurt a. M. On periodic changes of air in the external meatus. *Monatsschr. f. Ohrenheilk.*, No. 1, 1897.

15. MOUNIER. A new method of removing the wall of the attic. *Arch. internat. de laryng., d'otol.*, vol. xx., 1.

16. STACKE. On the employment of the electromotor in operations, especially of the nose and ear. *Arch. f. Ohrenheilk.*, vol. xlii., p. 81.

17. FREUDENTHAL, W., New York. A nose bag. *Arch. f. Laryngol.*, iv., 2.

14. By means of this rarefactor of SELIGMANN, driven by accumulators, the air of the external meatus can be rarefied 120 to 1000 times. Experiments made by S. for three years in cases of anchylosis of the stapes stopped the subjective hearing sensations for a longer or shorter time, but did not effect an improvement

of hearing. In rare cases the former disappeared entirely. S. recommends his instrument also for the treatment of adhesions and remnants of acute otitis media. KILLIAN.

15. MOUNIER devised an instrument similar to Hartmann's for the removal of the lateral wall of the attic without detachment of the auricle A movable chisel is fastened to a protector—similar to that of Stacke, but with its inner end bent at a right angle—in such a manner, that it can act only parallel to the horizontal part of the protector. Although only small portions of bone can thus be removed, which requires more time, the after-treatment is shortened. M. recommends his method in cases of caries limited to the lateral wall of the attic, and for the removal of the stapes, if the meatus is not stenosed. The operation requires the best illumination possible. ZIMMERMANN.

16. STACKE only mentions operations in the nose, opening of the accessory cavities, and treatment of deviations of the septum. Of aural operations, he only advocates scraping (with the electro-motor) the internal surface of the tympanic cavity "as far as possible into healthy bone" in cholesteatoma. S. considers this method as the least dangerous. BLOCH.

17. Two small ice-bags of india-rubber are connected through a small bridge of india-rubber, which are fastened on the nose by a strap. They are useful in epistaxis, filled with ice. Acute coryza is relieved by their application after being filled with warm water. ZARNIKO.

EXTERNAL EAR.

18. OLIVER, THOMAS. Double hæmatoma auris. *British Med. Journ.*, Jan. 9, 1897.

19. HESSLER. Ceruminal plugs of the meatus. *Arch. f. Ohrenheilk.*, vol. xli., p. 176; and vol. xlii., p. 1.

20. DENKER, A. A case of fracture of the anterior inferior wall of the meatus through violence acting on the lower jaw. *Ibid.*, vol. xlii., p. 31.

21. BLOCH, E., Dr., Freiburg. The diagnosis of perforations of the *Mt.* These ARCHIVES, German Edition, xxx., p. 121.

18. OLIVER'S patient was an alcoholic anæmic woman, aged thirty-six years, who was struck violently on each ear one week before admission to the Royal Infirmary, Newcastle-upon-Tyne. On admission, both auricles was very much swollen, especially the

right; the swellings, bluish in color, with shiny, irregular surfaces, being the size of large walnuts. Examination of the blood showed deficiency of red blood corpuscles, 2,800,000 in 1 *cmm.*

ARTHUR CHEATLE.

19. HESSLER found such plugs in one half per cent. of his cases, and describes sixty-seven, according to occurrence, etiology, symptoms, and course, diagnosis, prognosis, and treatment. They extend the meatus, push the *Mt* inwards, lead to atrophy of the bones, occasionally with all the symptoms of a cholesteatoma breaking into the cranial cavity. The treatment, of course, is, as a rule, more simple and the prognosis more favorable than in cholesteatoma of the middle ear. BLOCH.

20. The deeper portions of the ear were not injured.

BLOCH.

BOOK REVIEWS.

The Year-Book of Treatment for 1897. A Critical Review for Practitioners of Medicine and Surgery. Crown octavo, 488 pages. Cloth, $1.50. Lea Brothers & Co., Philadelphia and New York, 1897.

This excellent manual deserves all praise. The year's progress in the various branches of practical medicine is reviewed in twenty-five chapters by recognized English authorities. The practitioner is thus enabled to keep abreast with the advance and the literature of any one or more departments of medicine with a minimum of time, and the advantages of a specialist's critique. The chapter on the "Diseases of the Ear" is by G. P. Field, M.R.C.S., and the "Diseases of the Nose and Throat" are treated by St. Clair Thompson, M.D., etc. Both chapters are excellently written; the subject matter is presented in a clear, connected, if not exhaustive manner. In the present day of progress and great literary activity in medicine, books of this character are almost a necessity, and none fulfil the want better than this Year-Book. Its small size and moderate price are not unimportant points in its favor. A. H. K.

MISCELLANEOUS NOTES.

Dr. STACKE, of Erfurt, has received the title of Professor.

Professor PRUSSAK, whose name is connected with various anatomical structures in the middle ear, died at St. Petersburg in his fifty-eighth year.

The following is a list of the officers in the Section of Otology and Laryngology for the Meeting of the British Medical Association, to be held in Montreal from August 31 to September 3, 1897: President: G. MACDONALD, M.D., London; Vice-Presidents: W. TOBIN, M.D., Halifax; H. S. BIRKETT, M.D., Montreal; G. K. MCDONAGH, M.D., Toronto; Honorary Secretaries: A. CHRETIEN, M.D., Montreal; H. D. HAMILTON, M.D., Montreal; W. PERMEWAN, M.D., Liverpool.

TILLY HERBERT, M.D., B.S., has been appointed Surgeon to the London Throat Hospital, Great Portland Street, London.

We regret to have to announce the death of Mr. LEOPOLD HUDSON, Aural Surgeon to the Middlesex Hospital, London, at the early age of thirty-four.

EDITORIAL NOTICE.

By an oversight of the binder, Text-plate I., illustrating Dr. A. L. Turner's paper, has been omitted in some copies. Those of our subscribers who possess defective copies will receive the plate on application to G. P. Putnam's Sons, 27 West 23d Street, New York. It should face page 144 of this volume.

EDITOR.

Contents of the latest numbers of the Zeitsch. für Ohrenh.

Vol. XXX., No. 3. Issued May, 1897.

11. Re-examination of deaf-mutes, by F. Bezold.

12–13. Translation of Milligan's articles.

14. The literature of chloroma, by O. Körner. (Translated in this number.)

15. Respiratory closure of the lateral sinus, by O. Körner. (In this number.)

16. Mr. Downie's paper.

17. On the shape of the ear, by Dr. Karutz.

18. The after treatment of the operative exposure of the middle-ear spaces, by L. Grünwald.

Vol. XXX., No. 4. Issued June, 1897.

19. Two cases of pyæmia, by H. Eulenstein.

20. Ear affections in acute and chronic Bright's disease, by J. Morf.

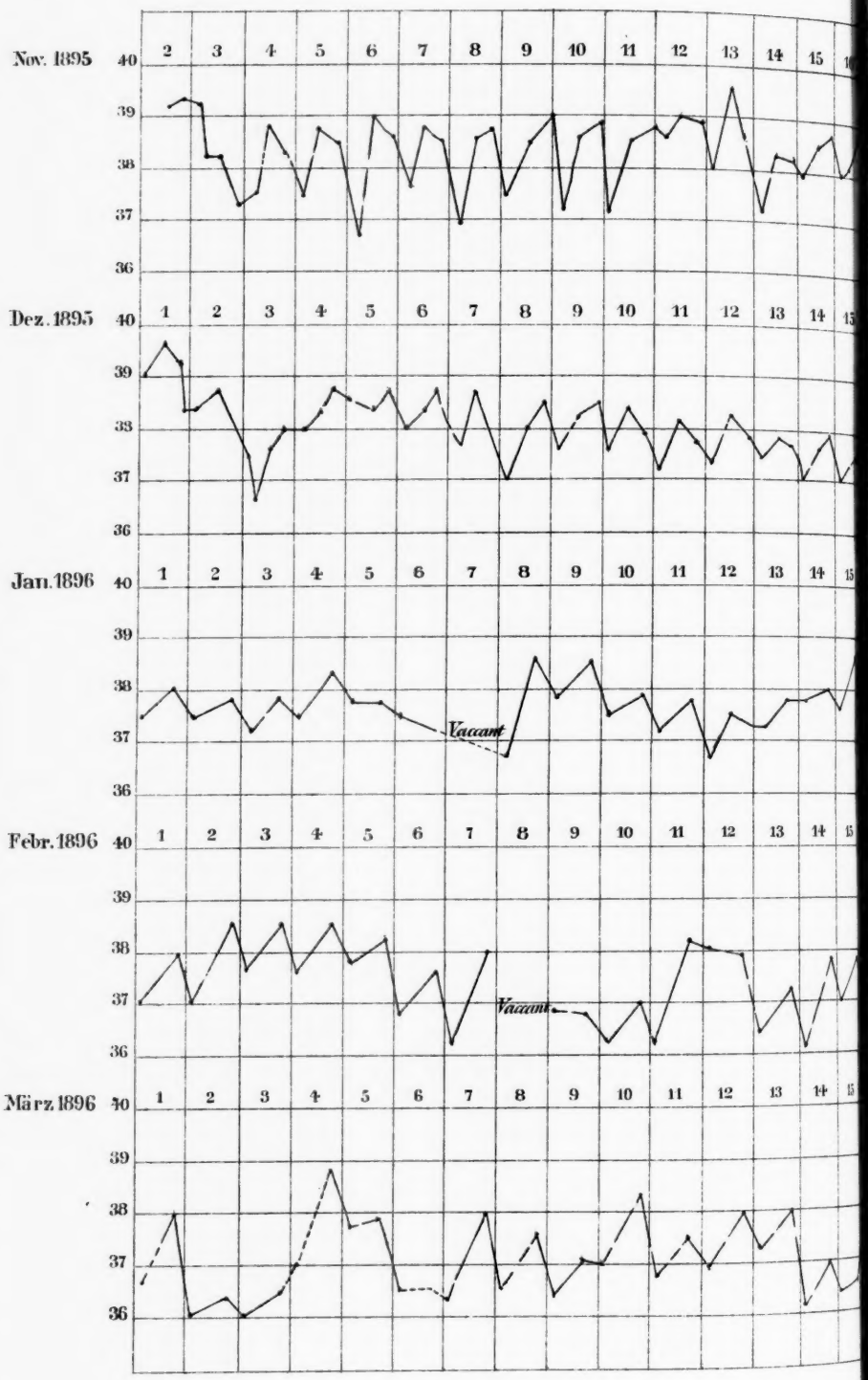
21. On the shape of the ear (concluded), by Dr. Karutz.

22. Dr. Bacon's paper.

23. On mild cases of middle-ear tuberculosis, etc., by A. Scheibe.

24. On the relation between the shape of the skull, the vault of the palate, and the hyperplasia of the pharyngeal tonsil, by W. Scheibe.

Report on the progress in otology during the first quarter of 1897, by A. Hartmann.



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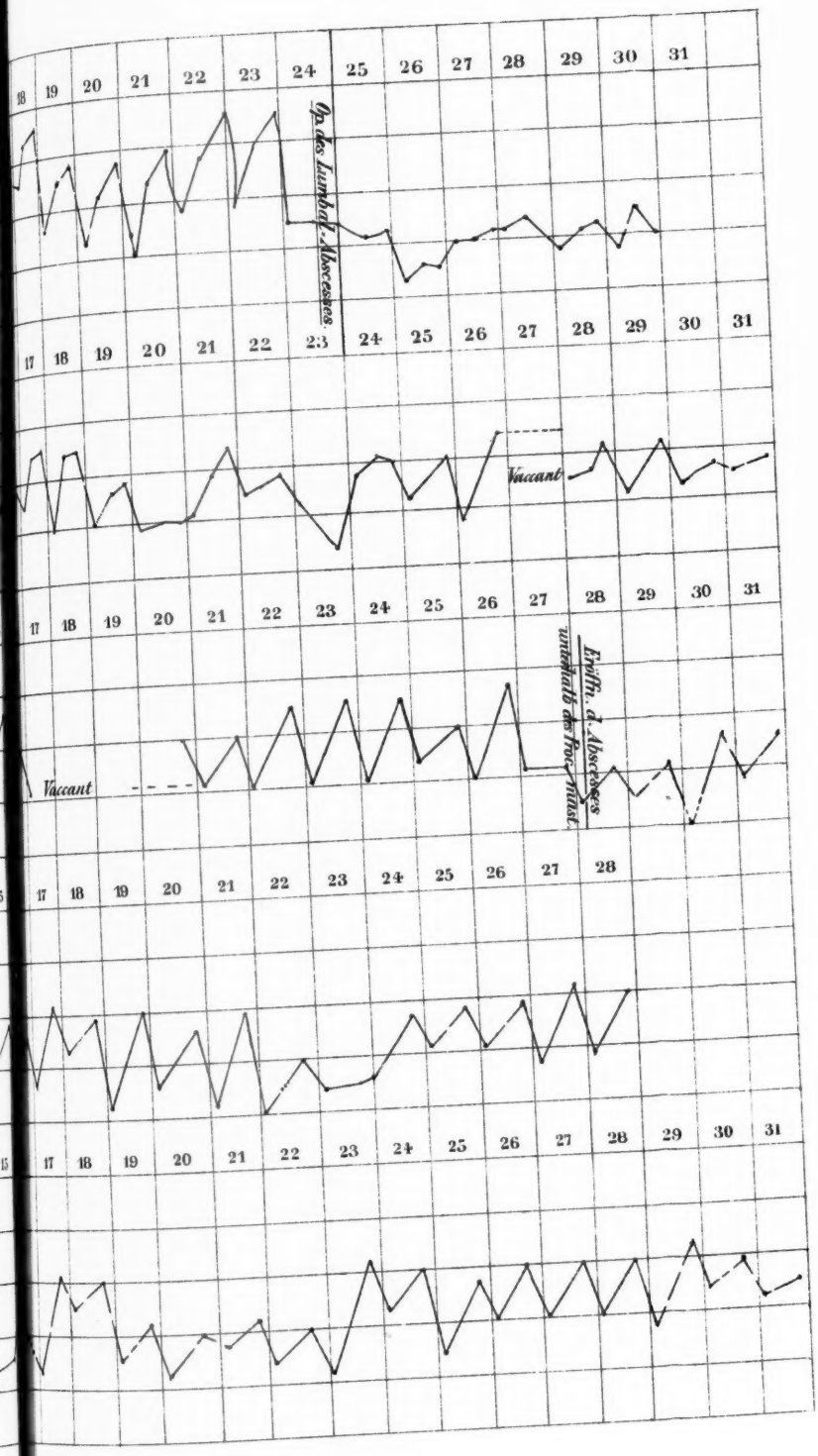

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2. Authors will receive gratuitously twenty-five reprints of their articles. If a greater number is desired,—notice of which should be given at the head of the manuscript,—only the additional cost of presswork and paper will be charged to the author.

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a. Write on one side of the paper only.

b. Write without breaks, *i. e.* do not begin a new sentence on a new line. When you want to begin a new line or paragraph at a given word, place before it in your MS. the sign ¶.

c. Draw a line along the margin of such paragraphs as should be printed in smaller type—for instance, all that is clinical history in reports of cases, etc.

d. Words to be printed in *italics*, should be underscored once, in SMALL CAPITALS twice, in LARGE CAPITALS three times.

4. Authors may receive proofs for revision if they will kindly return them without delay. We beg however to remind our contributors that changes in the copy are equivalent to resetting, causing so much additional expense. We therefore request them, to make, if possible, no alterations at all in their MSS., or, at least, to limit these to what is of essential importance.

ERRATUM.

On page iv, line 6, and page vii, line 18, of the Table of Contents, and page 414, line 3, read BLOCH instead of BLOCK.

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